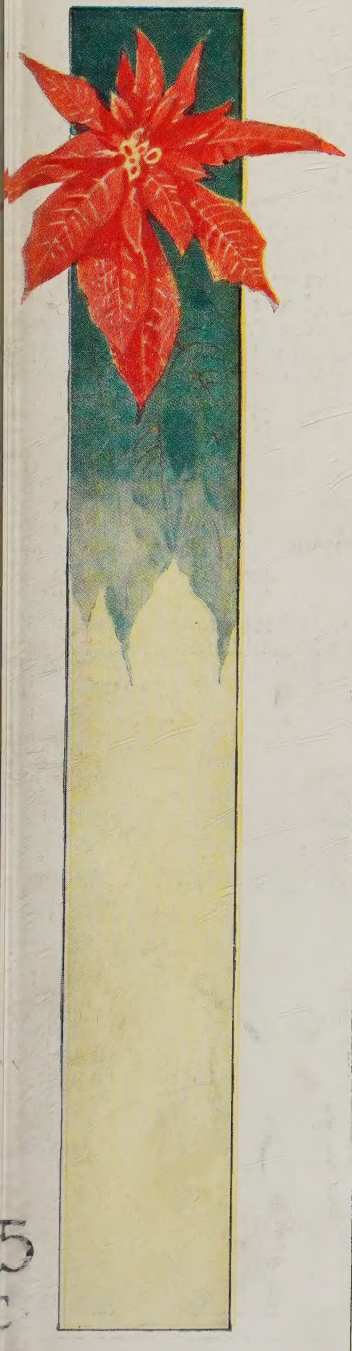
NATURE MAGAZINE



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The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

SO ENTHUSIASTIC has been the reception of our California issue that we feel justified in continuing the policy of geographical issues appearing perhaps two or three times during the year. We have received many voluntary letters of congratulation on the October issue, but we are sincerely regretful that in a few instances these congratulations have been qualified by comment on one point. On the cover San Francisco was referred to as " 'Frisco". After it was too late it was realized that this was as unfortunate as it was inadvertent. In fact, this unjustified contraction was used to save space and permit the inclusion of Berkeley, Oakland, Alameda and Lick Observatory. We tender an apology to all San Franciscans and sincerely hope that they will pardon us. We knew better and didn't "aim to do it".

* * *

The National Flower Vote has gotten under way with remarkable momentum and if it keeps up at its present speed we certainly should achieve a real decision on the popular preference for National Flower. A report of progress is made on another page in this issue and will be made each month as the voting goes on.

* * *

In many quarters the fight against the unsightly, scenery-marring billboard is going forward successfully. In Montgomery County, Maryland,—the county of that state contiguous to the National Capital,—the civic and women's organizations have organized a concerted campaign. They have called upon the county commissioners to draft a regulatory statute that will permit adequate check upon the erection of billboards along the roads which traverse beautiful country on their way to the District of Columbia. Major E. Brooke Lee, Speaker of the Maryland House of Representatives, is active in this campaign.

In connection with billboard restriction we reproduce on this page an illustration made from a blotter sent in to us by a member. Comment is unnecessary.

* * *

"We got everything we went after, including a narrow escape from mistreatment at the horns of a bull moose." This is the report of Arthur Newton Pack, our President, on the Association's Expedition to the American and Canadian Rockies. "Everything" means remarkable pictures and experiences, and the sentence quoted above will be amply justified by a group of articles beginning early in 1929.

* * *

The first issue of the *Nature and Science Education Review* has made its appearance and has been distributed to those requesting copies and a list of educators. Any who may have missed the first announcement may still obtain a copy of this new publication, which is being published by Arthur Newton Pack as President of the American Nature Association and a Director of the American Nature Study Society.

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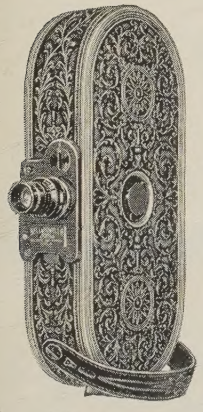

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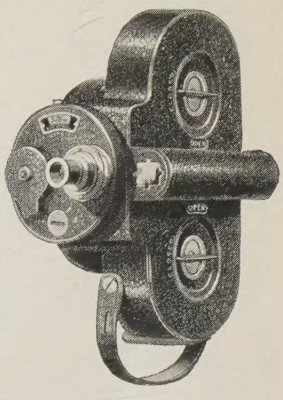

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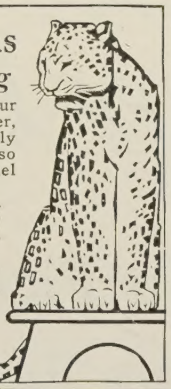

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Photographic DEPARTMENT

L.W. Brownell, Editor

What is the best type of camera, regardless of cost, for hunting big game?—N.T.H.

There is no type of camera from my point of view, as I think I have said in these columns before, that can hope to equal any one of those of the reflex type for such use as this, as there is no other camera that can so quickly, and easily, be made ready for instantaneous use and no other camera, except the tripod type, whose finder, if the ground glass on a reflex camera can be called a finder, gives the image the full size of the plate and exactly as the resulting negative will be. There are a number of makes, both domestic and foreign, on the market at the present time but I do not believe that there are many that are better than the Revolving Back Auto Graflex, fitted with a lens working at f6.8 or f4.5. Of course the latter allows of more rapid exposures in poorer light but, personally, I prefer the former as giving a greater depth of field and the occasion is very rare when this lens is not fast enough for all ordinary work. However, for work in the woods, where the light is not always as good as it might be, possibly the latter would be the more serviceable of the two.

This camera has the advantage of a length of bellows that allows of close-ups nearly, if not quite, life-size, when such a negative is wished. It is compact and light and makes but a very slight addition to the woods pack. It has a ground glass attachment for the back that allows it to be used on a tripod if so desired, can be used with either plates, cut or roll films, is capable of having one of the faster types of telephoto lenses that are now on the market fitted to it and, altogether, is the best all around camera for Nature work of which I have any knowledge.

Of course if one prefers to spend less money, or get a camera that will occupy even less room and be considerably lighter, the 3A kodak, fitted with one of the more rapid lenses and the kodak portrait attachment, can be made to turn out very good work. It also can be used on a tripod, if desired.

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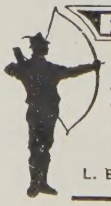

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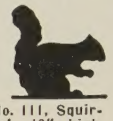

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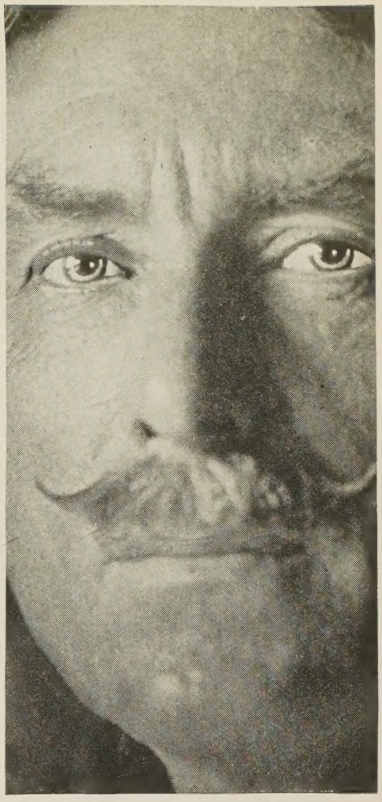

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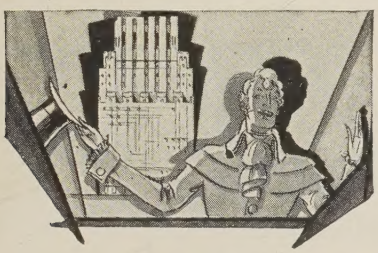

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Among the South American cruise tours advertised is that of the Lamport & Holt Line, which announces a sixteen-day cruise on the *S. S. Van Dyck*, visiting the Barbados, Rio de Janeiro, Montevideo, Buenos Ayres, Sandos, Pernambuco and Trinidad, and a forty-six day tour by the *S. S. Vestress*, sailing January the 19th visiting Barbados, Rio de Janeiro, Pernambuco and Trinidad. These tours include hotels and sight-seeing trips and among other things give an opportunity of seeing the Mardi Gras celebration at Rio de Janeiro. Such tours as these are steadily growing in popularity.

* * *

The Panama Pacific Company specializes on what they call the Recreation Route, being 5,000 miles of Ocean travel, sailing fortnightly by way of the Panama Canal to San Diego, Los Angeles and San Francisco. These tours are combined with a sailing route one way and rail route the other, and many people are taking advantage of them both on pleasure trips and business trips. Some of the steamers touch at Havana. The steamships *Virginia* and *California*, which the company claims to be the two largest steamers ever built under the American flag, are running on this fortnightly service.

* * *

The Clyde Line is running fine steamers on the Atlantic Coast Service to Florida and the Carolinas, leaving New York Tuesdays, Thursdays and Saturdays. These touch at Charleston, S. C., Jacksonville and Miami. Starting December the 1st the company will inaugurate a direct non-stop steamer to Miami, and starting January the 3rd a through service to Havana.

* * *

The Ward Line announces very attractive ten and seventeen day all-expense trips, including automobile, sight-seeing tours to Mexico. These sail every Saturday and the price is moderate.

* * *

The Canadian Pacific announces a very interesting South American and South African cruise by the 20.000 ton steamship *Duchess of Atholl*, sailing from New York on January the 22nd and giving you a hundred and four days of wonderful cruising and sight-seeing, including Rio de Janeiro, Buenos Ayres, Cape Town, Dar-s-Falham, Cairo and Paris. The feature of this trip is the up-country trip in South Africa, to Zululand and all of the country made famous by the novels of Rider Haggard, Victoria Falls, down the Nile and through a country which has only recently been visited by tourists.

* * *

Among the Mediterranean cruises is that of the *Homeric* of the White Star Line sailing on January the 26th. This is a sixty-

(Continued on page 351)

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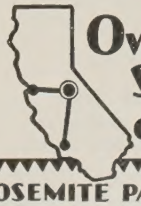

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A Bird Romance

There have been songs without words, and books of humor without wit; this, however, is a story without characters, written by Jane Kommers of Ripon, Wisconsin. After you have thought up proper bird names with which to fill up the blanks, look at page 404 to see how close you came to solving this dash-word puzzle. We will relent, however, and tell you that the hero is Bob White.

Excitement reigned in Birdland. —— —— and —— —— had eloped. Only their most intimate friends,—— and——, knew of the elopement, and they thought it quite a ——.

The bride was a bit uncertain about eloping, but did not —— when the hour arrived, for the groom said she was a —— and he might —— if she failed him. But they abandoned their contemplated trip to the —— Islands.

News is —— to travel, and upon their return all Birdland seemed to —— out to welcome them. Even a rejected country suitor was present, but he was a very —— ——. The considerate groom did not —— over his victory.

—— flowers were used in abundance for decoration. —— flew high and the —— of —— was seen on every side. Many had to —— their necks to get even a glimpse of the bride.

It was out of season to —— so the —— —— provided meat for the feast, and it was roasted by the —— over a fire made from an old —— fence. They feasted till they could —— no more. The —— furnished the music. They were presented with a —— clock and several ——. The —— published a detailed account next day.

NATURE ALMANAC

by ARTHUR NEWTON PACK and PROF. E. LAWRENCE PALMER
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CAMERA TROPHIES 1928

SPEAKING of adventures—we were bent on taking motion pictures of those wild red foxes 'way over back of farmer Alvord's place, but what a battle of wits we got into! The old lady moved her cubs three times. Twice we were able to follow—then she lost us. Two weeks of work and 180 feet of film—but what film!

Then I perched three hours 60 feet up a sugar maple, concealed under my "magic carpet" blind, and took rarest shot of red-tailed hawk arriving home, mouse dangling from her beak like a princess's ear-ring!

Also this season, up in Nova Scotia, I captured the shy minister gull on my motion picture film, and intimate camera interviews have I had with the osprey.

These **trophies** will be added to the already rich material included in my illustrated platform lecture—**Wild Life Adventures**—a favorite among schools and, I am told, an inspiration to students and teachers alike.

There are other subjects, too, including **Cruising the Canadian Labrador,** a pictorial story about the now famous Greenly Island country.

(Note: Fall and early winter will be spent in the east. In January 1929 I go to the middle west.)

Let me send you an illustrated circular.

Howard H. Cleaves

American Nature Association

15 Boudinot St., Princeton, N. J.

TRAVEL DEPARTMENT

(Continued from page 349)

seven day trip of 14,000 miles visiting Madeira, Cadiz, Seville, Granada, Gibraltar, Algeciras, Algiers, Tunis, Naples, Athens, Constantinople, Jerusalem, Bethlehem, Egypt, the French Riviera and returning by way of Southampton. More particulars may be obtained from Thomas Cook & Son.

* * *

Schedules and prices of the United Fruit Company Steamship Service to Caribbean ports have recently been announced, and very attractive literature may be obtained in relation to these tours and trips by writing to Nature Magazine. This company's steamers stop at most of the prominent Caribbean ports and special trips to any section of the Caribbean may readily be arranged with every assurance of comfort, convenience and safety.

* * *

Regular rail and motor-bus tours of picturesque Death Valley, California, are operated from November to April, inclusive, by the Union Pacific System, in conjunction with the Tonopah & Tidewater Railroad. This tour may be made en route to Los Angeles, or as a round trip from that City. Death Valley's winter climate is delightful, and its desert scenery, walled by lofty mountains, is grand and colorful. Excellent hotel accommodations are available on the valley floor.

* * *

The Union Pacific System operates three daily through trains between Chicago and Los Angeles, headed by the Los Angeles Limited (extra fast and extra fare). This train and the Gold Coast Limited (no extra fare) are de luxe, all-Pullman trains, carrying latest type diners serving all meals and handsome observation cars with shower bath facilities, barber, valet and maid service. The Union Pacific System also operates fine fast through trains from St. Louis to California.

* * *

An attractive model of the new motor liner *Kungsholm*, of the Swedish American Line, is being exhibited at the entrance to the Jade room of the Waldorf-Astoria Hotel in New York, and is the object of considerable interest on the part of the public. The model, which recently arrived from Sweden, is over twelve feet long and is an exact replica of the ship.

* * *

The Cunard Line announces another world cruise of the steamer *Franconia* sailing from New York on January the 15th and returning on May the 31st. On the 1928 world cruise of the *Franconia* there were, according to Dr. Carr, the surgeon-in-charge, people on board who had made seven world cruises and expected to make more. This is the best possible evidence of the delightfulness of these trips, and an indication of why the number of people who are taking them is constantly increasing.

* * *

Thomas Cook & Son announce a 1929 cruise of the *S. S. Homeric* to the Mediterranean, sailing from New York on January the 26th and returning on April the 1st with a very full and complete and attractive itinerary.

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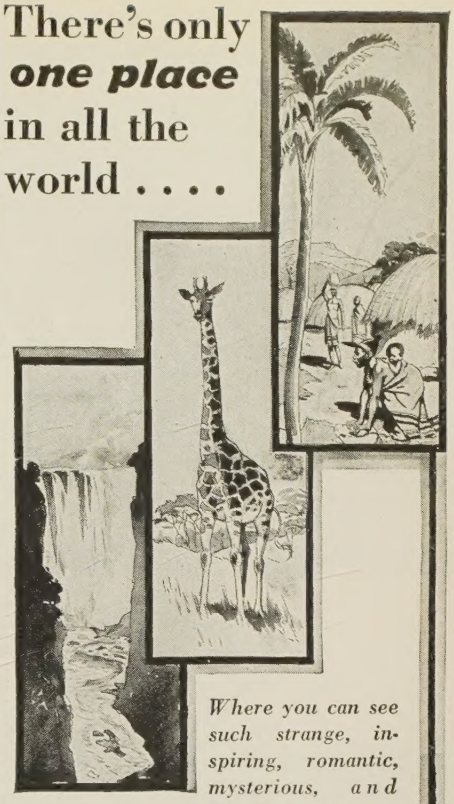

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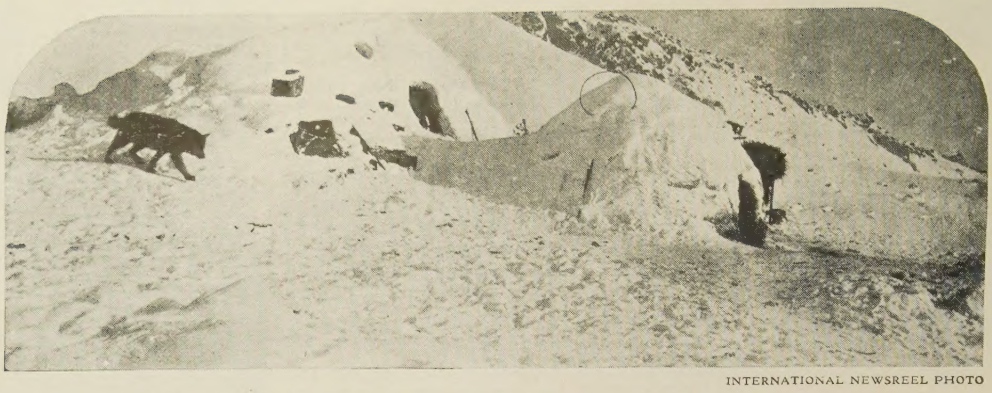

INTERNATIONAL NEWSREEL PHOTO

"OUT OF THE NIGHT, WHICH WAS FIFTY BELOW"

The rim of the Arctic sun hovers briefly on the horizon, while malamute and man creep forth from their snow huts to greet it. Christmas with explorers in Santa Claus land is not all plum pudding

NATURE MAGAZINE

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THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

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TIGER—*Felis tigris*

LION—*Felis leo*

LEOPARD—*Felis pardus*

SNOW LEOPARD—*Felis uncia*

CHEETAH—*Acinonyx jubatus*

CAFFRE CAT—*Felis caffra*

Old World Cats

by Carra E. Horsfall

Color Plates by
R. Bruce Horsfall

Centuries ago some half-savage boys and girls must have kept baby kittens after the wild mothers had been killed. These kittens grew accustomed to handling and gradually came to be part of the family possessions.

The domestic cat of today is probably the result of an intermingling of several races of wild cats. The caffre cat, common all over Africa, is much like our present day race in appearance and has many similar characteristics. It is much stronger, with body and legs proportionately longer and the tail shorter and thicker, but it is probably one of the ancestral strains from which our modern cat has sprung. The color is variable and shows most of the phases usually found among tame cats. The markings are sparse and would not account for our tabby-cat, but since the caffre cat breeds freely with domestic cats, it is likely that the European wild cat has done the same; thus the tabby pattern may have come about. The caffre cat is largely nocturnal in habits and preys upon game birds, poultry, hares, rabbits and other small mammals which abound in the African wilds or are found about the scattered native villages.

Perhaps the best known wild cat is the lion which has long been kept in zoological parks where it can easily be observed. Fortunately it thrives and breeds freely in captivity. There are normally one to four maneless cubs with little bars on side of body and a black line along the middle of the back. The mane of the male begins to grow when he is three years old and attains its full beauty at the age of six years. This mane and the tail tuft distinguish the lion from other species of cats. It also differs through its inability to climb. It is usually not dangerous if not disturbed. Being nocturnal, it feeds on zebras, buffaloes and other animals which it hunts at night. This great cat is still to be found on the plains of Africa, India and parts of western Asia, but no longer in Europe.

The leopard also ranges over the entire African continent from Cape of Good Hope to Atlas Mountains, in Asia from China to the Black Sea. It is less often seen than rarer animals because it is nocturnal and lives mainly in trees and caves. It varies greatly in size, color and markings, though the latter always have their characteristic shapes. Melanism is common especially in the highlands, the black and spotted forms being found in the same family. The leopard of cold regions is provided with thick warm fur and is paler in color. This savage animal is more feared than either lion or tiger, for if it turns man-eater, there is no safety in its neighborhood. Ordinarily it feeds on cattle, sheep or dogs, and it will even take chickens from the roost. There are four or five young which look much like the parents.

The cheetah is the only living representative of this group of animals, though a fossil form is found in the Siwalik deposits in the north of India. It is about the size of a leopard and its long slender limbs enable it to run for long distances as swiftly as a horse. This, and the ease with which it may be trained to hunt for its master, as well as the structure of its muscles, show dog-like characters. Naturally docile and friendly, it has been used in the chase from the most ancient days. Its claws do not move back into the sheaths as do those of the lion and tiger. It is found in countries east of the Caspian into India and is common in Africa where, until recently, its range extended into Cape Colony. It preys on antelopes and similar animals. The young differ from the adults in having long soft brown hair, obscurely spotted.

In captivity the snow-leopard is the gentlest of the large carnivores, being quiet, sleepy and much like an overgrown domestic cat. However, being used to a cold climate, it does not thrive in the temperature of an ordinary lion house. It is covered with dense, woolly fur, has a wonderful long, fluffy tail and sometimes a short mane. As its name indicates the color is white with snow-shadow gray toning; the black or dark gray markings stand out beautifully on this background. It is at home in the mountains of central Asia and in the Himalayas from nine to eighteen thousand feet altitude, but is rarely found below snow line. It frequents the home territory of the ibex, mountain sheep and goats and feeds upon them as well as domestic sheep and dogs. It has not been known to attack man.

The tiger is the largest and most powerful of existing cats, and is distinguished from all others by its striped coat. It is exclusively Asiatic and ranges all over the continent, the Siberian members of the family having thicker fur. It seizes its prey with its teeth, using its paws to hold the animal. Despite its great strength the tiger is cowardly and may even be made to drop its prey by cattle rushing at it. It has a voracious appetite and does much damage to a herd, so is ruthlessly hunted. It can climb trees though it does not commonly do so. It also swims, crossing good sized rivers and is known to go by night across Jahore Strait to the vicinity of Singapore, having special sandy landing places. There are two to five young born each year. The tiger thrives as well in captivity as the lion, hence is a member of most zoological colonies. There is nothing more interesting to watch than the playful antics of a pair of frolicsome tiger twins, who are much like overgrown house kittens.

NATURE CALENDAR

DECEMBER

by E. Laurence Palmer

PROBABLY few people have done more to quicken the Nature interests of the public generally than has Rudyard Kipling whose birthday comes in December. We began with the *Just-So Stories,* took the *Jungle Books* to bed with us, and, when we reached the romantic age, somehow felt that things were not right unless they had a Mandalay setting. We began with the imaginative antics of Old Man Kangaroo, fought and won battles with Mowgli, adventured with Kim and then associated Kipling with Fuzzy-wuzzy, Danny Deever, Tomlinson, or, possibly, Gunga Din. If we were less adventurous in spirit we may have gone with Kipling into some of his finer, more gentle philosophy, but whatever way we went with him we still thought of him and his stories built around actual or imaginative Nature.

While Christmas meetings of Nature workers discuss the merits or demerits of teaching children about scientific names the children themselves are gloating over the way the "stute fish" speaks of the whale as a "noble cetacean". While college classes in zoology are studying the "anatomy of the cat" children are being reminded by Kipling of the temperament of the cat which requires that it "walk by its wild, lone self". We flock to see "Chang" in the hope that we get a more intimate acquaintance with the atmosphere in which Toomai and Mowgli lived and Kipling is largely responsible for this interest.

It is unfortunate that Kipling could not have written of the life of America instead of that of India. "Flying fishes play" off Florida and California as well as near Mandalay. Our continent boasts of great areas in which adventure may be expected at any turn of the road and these adventures may be with man or with beast and may be disastrous unless met with the best that is in us. Read and reread Kipling this December and then see if America doesn't mean more than ever to you. We live on a continent in which there is little monotony. During the month some of us may collect aquatic insects by thawing out a bunch of leaves collected under the ice in some stream. Meanwhile, others may be kept on the alert by mosquitoes which come from much warmer waters. Nasturtiums may be growing in the yards of San Francisco while only the hardiest of plants can survive in New York during the month. Oranges hang to the trees of southern California and Florida, while the trees of the north are bare of fleshy fruits except where oranges appear on Christmas trees.

Mowgli's folk dreaded the tiger, Shere Khan, and our folk dread the attacks of those minute organisms which are to be found in impure milk, stagnant water, on unwashed fruit and even in the air which we breathe. Many of these organisms are infinitely greater enemies to mankind than the tigers or other large man-eaters. Like Mowgli we have learned that it is more healthy to sleep with fresh air in our lungs than in the foul air of dwellings. Mowgli laughed at the tiger while other men cowered before him. Mowgli beat the tiger at his own game while the other natives tried to fight him with enchantments and incantations. The modern "wise man" has learned to fight his enemies where he must, beating them at their own game instead of attempting to keep them off with charms or other absurd defenses. In December, we are changing our method of living from that of the summer months and we are justified in giving some thought to the necessary adjustments.

Kipling tells us delightfully of Rikki-tikki-tavi, the mongoose, and those whose winter slumbers may be disturbed even on Christmas night by mice and rats might wish for a pet mongoose to get rid of the vermin. It is pertinent to call attention to the fact that these animals were introduced into Hawaii to destroy rodents in the crop lands. They succeeded to some extent and then set out to clean out the birds as well. The result is that Hawaii has few birds that nest upon the ground and the mongoose has become a pest. The introduction of exotic species of life into a new territory should be undertaken with intelligent foresight.

Crows are beginning to give their peculiar mating "conversations" in the warmer parts of the country such as southern California. The Florida barred owl is about ready to nest. In the north, if the winter is severe, great-horned owls and snowy owls may be moving south to pick up what little game has been left in the coverts by the human hunters. The stories of winter mammals are written in tracks in the snow and need our own genius for interpretation.

ROSY FLAMINGOES FROM EGYPT

REPRODUCTION OF A PAINTING FROM LIFE OF THE PAIR OF FLAMINGOES PRESENTED TO THE NEW BIRD HOUSE OF THE NATIONAL ZOOLOGICAL PARK BY THE AMERICAN NATURE ASSOCIATION

NATURE MAGAZINE

Volume Twelve

No. Six

December, 1928

THE RACCOON HAS PLACED MAN HEAVILY IN DEBT

Far too many coats have been fashioned from the pelts of these interesting little mammals

The author of this article has devoted long field study to the problem of the fur-bearer and speaks with a full knowledge of conditions as found in the woods.

OUR DEBT to the FUR BEARER

An Age-Old Industry Has Reached a Turning Point

by W. E. Sanderson

FUR bearing animals have played a large part in the development of the United States and Canada. Almost the first trading between the white man and the Indian involved an exchange of valuable beaver, mink and otter pelts for cheap, showy beads, brass kettles, knives and colored print cloth. The Pilgrim fathers repaid much of their passage money by the pelts sent back to England. Skins were frequently the common medium of exchange between early settlers. Many an acre of ground which today would represent a king's ransom has been paid for in skins.

The demand for pelts of the great variety of fur bearing animals found in America was such that the hardy colonists were constantly pushing back into the new country in order to increase their catch. Whole sections of the now populous districts of the United States owe their early development to the daring enterprise of skillful hunters and traders, of whom Daniel Boone stands as a conspicuous example. Even the far-flung expedition of Lewis and Clark to the Pacific Coast was closely followed by John Jacob Astor, who established a string of fur trading posts across the continent to his station Astoria at the mouth of the Columbia River. His company became one of the largest business enterprises in the newly formed United States, as had the Hudson's Bay Company in Canada.

As settlement increased, the

A YEAR ago Nature Magazine featured an article by Edward A. Preble under the title of "Our Disappearing Fur-Bearers". It brought forth considerable comment and much enthusiastic approval from conservationists and Nature lovers. It was reprinted in a special bulletin, illustrated with Horsfall color pictures, and widely distributed. A few copies of this bulletin remain and are available while they last at five cents a copy in lots of ten or more. It is a document which every conservation worker should have and use in his or her education work.

SKUNK AND SQUIRREL
Many a trap set for the former has caught in its steel jaws the tiny animal who dies in agony and is thrown aside

HOME OF THE MUSKRAT IN WINTER
For a long time this little mammal was scorned as a fur-bearer but now it is much in demand

forest land was cleared for agriculture and ruthless war was made upon the larger types of fur bearers that had quickly acquired a taste for domestic stock or had a dangerous reputation. Thus, the bear, the panther, the wolf and the bob-cat were greatly reduced and found opportunity to propagate only in the more rugged districts.

Even the smaller animals were forced to alter their habits somewhat in order to meet changing conditions, but some of the wild woods creatures were not entirely averse to the encroachment. In spite of the apparently unending war made upon them for their pelts, skunks, raccoons, weasels and foxes found that civilization provided them new sources of food sufficiently alluring to keep them close to the habitations of man. And as man exterminated the cats, wolves and foxes, these enemies of the smaller animals were eliminated. Man could destroy the balance of Nature but he could not control the results that followed. It is interesting that many of the states now producing the largest number of pelts are thickly settled. Pennsylvania, New York, Minnesota, Maryland, Louisiana and Wisconsin are all large fur producers, yet all have large human populations.

For a long time the muskrat was scorned by the trapper, and while other fur bearers were decreasing in numbers it was holding its own, if not increasing. The growing scarcity of other furs and the ready substitution of muskrat for the more valuable pelts, however, has seen this formerly unwanted animal become the leading fur producer of America. Marsh lands suited to muskrat farming have increased in value from almost nothing to many dollars per acre. The swamps of Louisiana and New York, the marshy coast lands of Connecticut, Delaware, Maryland and Virginia, are now annually producing several millions of pelts each year. Their ultimate crop of fur is largely dependent upon the development of wise conservation methods and farming operations based on careful scientific study.

Though the fur bearer has played so great a part in the rapid economic development of our continent, very little attention has really been paid to trapping as an industry, as is evidenced by the fact that no one can safely estimate how many fur pelts are yearly taken in the United States. A few states have made some attempt

to have trappers report their catch. New York, Louisiana, Wisconsin, Minnesota, Pennsylvania, Massachusetts and Maine are among those requiring reports of licensed trappers. The totals reported in one year from these states amounted to approximately 6,000,000 pelts. If to this is added 25 per cent more, representing the skins taken out of season and by unlicensed trappers, we gain a total of perhaps 7,500,000 marketable pelts. The rest of the nation may produce 20,000,000 to 40,000,000 more. The total is staggering. A statement made by the fur industry that the value of the annual fur catch in the United States equals $65,000,000 shows that the industry is a large one. This, of course, does not take into consideration the enormous import of skins from foreign countries or the cost of manufacture.

Many states are almost devoid of legislation to protect the fur bearer. Even some of those states that have passed laws limiting trapping seasons and setting up other regulations governing capture have done so in a haphazard manner. Much of the legislation is the result of prejudice against certain species because of imagined or real injury to game animals, birds and fish, or because the farmer regards them as the enemies of his domestic stock or fowl. In no field is there greater need of careful and intelligent study than in that relating to wild animal life.

Each year finds the variety and the number of fur-bearing animals growing less and less, and the wonder is that any are left alive except in the most inaccessible places. A study of the fur sales reveals that otters, martens, wolverines and ermines come in constantly smaller quantities in spite of the stimulus of higher prices. Will they disappear entirely is a question that many a thoughtful scientist has pondered seriously. The mink has been trapped until it has practically disappeared in many districts where it was formerly common. Some states for several years have had a closed season on the beavers. It would unquestionably come back were it not so persistently sought by the trapper and its pelts "bootlegged" into territory where it may be lawfully taken.

So far we have considered only the conservation and economic side of the fur bearer. These considerations govern nearly all the legislation up to the last few years. The fate of the animal itself has been but little considered.

BABY MINKS, JUST A HANDFUL

In many localities where minks were once common they are no longer to be found, such has been the trapping

Trapping is a business little understood except by the trapper, the trap manufacturer, the woodsman and the field naturalist. The fur industry apparently was satisfied until recently that the supply of animals was unlimited to meet the demands of the trade. The trapper is often a man of limited imagination and of solitary habits. He sets his traps in the fall and winter along lonely trails. His observations largely center upon the best

MUSKRAT AND BEAVER

Muskrat farming is rapidly growing. In some states the beaver is protected against further depletion

methods of locating sets and the easiest methods of increasing his catch. Little need be expected from him that will help to increase the native stock or prevent the destruction of animals or birds that do not add to his catch. In fact, he is frequently obsessed with the notion that law or no law he must take the animals or some one else will.

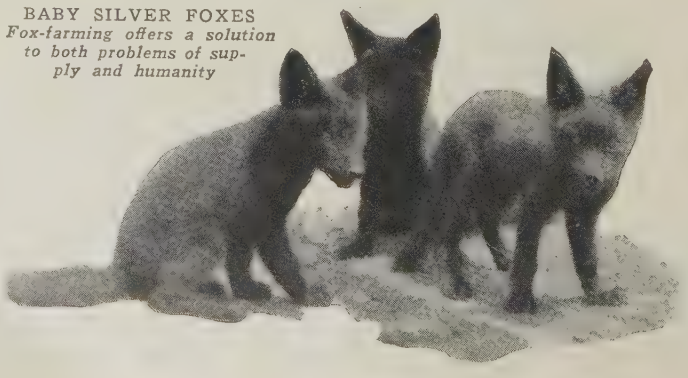
This indictment does not mean that the trapper is an unprincipled wretch. He is not by any means. But his limited opportunity to see the problem from its larger angles, ill-advised legislation, the constant bread-and-butter question, unrestricted competition, and a heritage of handed-down information, have conspired to make him his own worst enemy as well as that of the woods folk themselves.

ERMINE
A weasel in its winter coat supplies this fur

During the past few years there has been growing in the minds of those who love the woods that all is not well in the treatment of the wild life of America. Powerful organizations have been forming to act as the physician and prescribe the remedy. Each group, governed by its peculiar interests, has been seeking to save that particular form of wild life in which it has its chief interest. In the work of some of these groups there has been a conscious effort to insure a more humane method of taking the different wild animal species. It has repeatedly crystallized into definite proposals for methods that would insure better sportsmanship.

The thought has been variously expressed that the person taking game animals or birds for food or pleasure, as well as those catching the fur-bearers for profit, owe a great deal more consideration to the animals or birds involved. Is it too much to ask that these wild creatures be spared hours or days of prolonged suffering to satisfy the sportsman or the trapper? So insistent and widespread has become this plea that no matter what one's personal feelings may be toward the infliction of pain, we cannot ignore it in planning legislation for wild life.

For centuries we have accepted the trapping and the fur industry as representing merely so much in pelts and dollars. Now the public is beginning to measure the business in terms of pain and suffering. Those who have closely studied this problem are convinced that the total amount of suffering inflicted upon the fur-bearing animals of America has made the inhumane treatment of domestic animals almost a second consideration. This is true even if we except the animals killed for fur by means of drowning sets, shooting and other methods which have brought a humane death, or have been taken alive and unhurt.



BABY SILVER FOXES
Fox-farming offers a solution to both problems of supply and humanity

In spite of the evident need of conserving the great natural resource found in the fur-bearer, little intelligent effort is made to perpetuate the different species of animals or to save for breeding purposes the better type of individual. The methods employed for taking most of these animals make use of the leg-grabbing steel trap which takes whatever comes its way. Females with young and immature stock are as easily captured as the surplus males that should be taken for the good of the others. A trap set for an otter may catch a blue heron or an owl; one set for a skunk may take a rabbit, a squirrel or a bird. Usually, the injury to the animal is so severe that even though it be released, death follows. Some interesting studies have been made of trapped animals that have been released in captivity under conditions as nearly like their natural state as possible. The majority of these animals have died under the best of care, through the congestion set up from the injury received in the trap. It is true that many muskrats and skunks, minks and martens have escaped from a steel trap by twisting or wrenching off their feet and have subsequently been caught. Skunks have been found in traps caught by their remaining sound foot. How many have been killed from which no one received any profit can never be known. Nor can anyone reckon the very serious damage done to the breeding stock of game birds and animals from the use of the common steel trap. It seems almost foolish to be talking or thinking of conservation where a program seemingly so unintelligent is being carried on. A changed condition would quickly take place were there any direct cost to the trapper for propagating his breeding stock. The mystery of the whole matter lies in the fact that any game or fur-bearers remain under so haphazard a plan. The fur farm, which has received a great deal of recognition during the past few years, and which promises ultimately to save certain breeds from extinction, could not make money by following such a loose and ill-defined policy. A careful selection of breeding stock, and a scientific choice of those pelted promise to bring this relatively new industry through with flying colors.

Time and again the attention of those who read some of the farm papers or chance to glance through a certain type of magazine for boys, have been struck with the number of lurid advertisments which hold out extravagant rewards to the boys who trap animals for their pelts. Many a lad has pictured fortune for himself, after

studying these announcements and reading the price lists of enterprising fur-dealers. There may be some trappers who make large incomes but the number is relatively small. Some of them are earning barely enough to keep soul and body alive. If the professional trapper, who has given years of study to the habits of fur-bearing animals, and knows many of the secrets of trapping, finds it difficult to make a bare living, how much more difficult will it be for the school or farm boy to earn large sums during his spare time?

We have heard those who had some financial interest at stake speak of the large numbers of farm boys who have earned their way through college by trapping. We have never met with such a one though we have had considerable experience with farm boys who have gone to college. Usually their earnings from trapping, if they trapped at all, were meager. A typical case of a real boy may be illuminating. He and his brother lived on a farm in New York State along which a stream ran. There were a number of acres of woodland. Skunks and muskrats were common and a few minks were still to be had. The boys entered enthusiastically into their work with a dozen or more traps as their capital. The traps were set one Saturday afternoon in what they regarded as likely places for skunks. They could scarcely wait to visit the traps the following morning. By seven o'clock on Sunday they were back home disappointed but not disheartened. The rounds were made earlier on Monday morning in order that they might get back home in time to finish their chores before going to school. Again they found nothing. This was continued for several days with similar results. By this time their enthusiasm was wearing out. It is no joke to get up before five o'clock on a farm in the winter, an hour earlier than your usual rising time, to inspect traps that produce nothing. It was, therefore, an easy matter for the boys to persuade themselves not to go the next morning but to wait until after school. The skating was good and the temptation to enjoy it rather than rush home to inspect the traps before dark was too strong to overcome. When they did go the following morning, they found, along the bank of the stream where a trap had been set on a likely muskrat run, the five toes, a little leg bone and some tendons that had been pulled loose by the struggle of a muskrat that had been caught. It was a souvenir of their skill in placing the trap but it brought no profit to the boys nor did they think of the suffering of the animal which had put up such a desperate fight to escape even with so great a handicap as the loss of a foot. Soon, two or three days were elapsing between visits. One morning a weasel was found, but in skinning it the pelt was cut in so many places that it could not be sold. A red squirrel and two or three chipmunks inadvertently sprung traps and were later found dead on these intermittent inspections. A rabbit's foot and some fur told the story of a cottontail that had been caught and had fallen the victim of some predatory animal or bird which discovered it for an early morning breakfast.

One Sunday afternoon, late in the spring, after the fur was no longer prime, a skunk was caught. The trap was on the side of a bank making it difficult to approach the animal. It was decided best to shoot the animal. The boys possessed a revolver but had no skill in using it. A dozen shots were fired, several of them taking effect as was later shown, before the animal was killed. This pelt, like the weasel, was in such condition that the local fur-buyer would not consider it. By this time, discouragement had completely mastered the enthusiasm at the beginning and the traps were left in their places, some of them sprung but others still potential enemies of any living thing that passed across their trip-pans, until their father demanded the traps be collected. True, the boys had plenty of fresh air and fine hikes when they were actually inspecting the traps but their ultimate sale of skins amounted to nothing. A number of animals and birds had been destroyed without purpose at a cost of pain and suffering beyond words to describe.

A legislator, who is very much interested in the conservation of wild life, recently told of his experience as a boy trapper that could be duplicated in the cases of scores of boys. One day, on making his inspection of traps, he found one of them gone. He thought it had been carefully anchored to a nearby tree, but the tracks in the snow indicated that a raccoon had been caught and had pulled the trap loose. He traced it until the trail led into the woods where the snow was gone. He searched long that day and came back on several other occasions to renew the hunt but without success. Two weeks after the loss of the trap, his father came home one day and said—"Sam, I think you will find your trap in the ditch along the road just below the barn". He went hurriedly to the place indicated, and, sure enough, there was his trap, being dragged along slowly and painfully by a raccoon now reduced to a mere bundle of disheveled fur. He quickly dispatched the animal but the pelt was so badly damaged that it was not worth removing. For two whole weeks that animal had struggled to find an elusive food supply, only to starve and endure the excruciating pain inflicted by its relentless leg iron. "That was the last animal I ever caught in a steel trap", said the legislator, "and I stand ready to put such traps out of business".

If boys feel the call of the trap, there is no reason why they cannot match their wits against the cunning of the woods folks and yet avoid torturing to death these creatures which have done them no wrong and which, if taken humanely, will yield them a profit. The trapping range of the boy is always small, so that the objections to box traps that take the animals alive and unhurt, which might be raised by the professional trapper who goes back into the wilderness miles away from civilization, do not hold. By means of his toboggan, his sled or his cart, he could bring to his trap lines homemade box traps which would do the work as efficiently as the leg-grabbing steel trap, yet avoid mutilation and injury. If unwanted animals or birds are caught he can release them with the satisfaction of knowing that he has not done them any permanent injury.

Many of those who trap in the wilderness country, far from civilization, set scores of traps over a line that may be as much as a hundred miles long. The line is usually so arranged that the trapper can stop overnight at cabins near his trail. Under the most favorable weather conditions it may take a week or ten days to go over the line and return to headquarters. Where animals have been

(*Continued on page 397*)

JOEL ROBERTS POINSETT
Former United States Secretary of War and our first Minister to Mexico, for whom the poinsettia was named

Whence the POINSETTIA

How the Popular Christmas Symbol Grows and Got Its Name

by Ethel I. Mason

About a hundred years ago, one of the most important appointments in the diplomatic portfolio of the State Department was the selection of our first Minister to Mexico. The question became a political one of great interest, and finally resolved itself into one of the burning issues of the hour that was at last settled by the selection of a brilliant young Congressman from South Carolina named Joel Roberts Poinsett.

Poinsett had not only received a part of his education abroad, but he had later traveled extensively in Russia and in Asia and had acted as a special envoy to the Argentine and Chile, as well as to Mexico itself, in an earlier administration. He was, therefore, peculiarly well fitted for so difficult a task, which he carried through with such distinction that he later became a member of the Cabinet, as Secretary of War under President Van Buren.

However, though it was at that time that he fostered the first scientific expedition ever organized by this government, when Lt. Charles Wilkes, U. S. N., set sail for the South Seas, Poinsett's chief title to fame in the opinion of the average flower lover rests with the fact that he made known to the world the Christmas plant that was named in his honor, the poinsettia.

Many beautiful flowers and rare shrubs have been given the names of the explorers who first discovered them, as appears to have been the case with the poinsettia. It was a native of Mexico and Central America, where it was known as the "Painted Leaf" or "Mexican Fire Plant", and the discovery was a result of Poinsett's mission to Mexico, when he brought it to the attention of botanists.

A SYMBOL OF CHRISTMAS
Black and white can scarcely do justice to the red bracts and green leaves of this plant

Contrary to popular impression, the flaming red bracts of the poinsettia,—and it may be spelled without the second "i",—are not flowers, but leaves, and it is for these bracts that the plants are grown. It is possible to have variations of either pink or white varieties, as well as of the more usual red, popular because it carries out the holiday color scheme of rich bright red with a contrast of the dark green of the leaves. There is an inconspicuous flower, and though the gardeners are well acquainted with the variety of poinsettia that may be grown from the seed outdoors, and which flowers in the early fall with leaves that turn red, the florist is far more interested in the hothouse

type that is grown from the old stock, and which has either the single or the double leaf.

This shrub is a member of the genus *Euphorbia,* which is said to have been named for Euphorbus, physician to King Juba, ages ago. It is of the Spurge family, and has upwards of some seven hundred or a thousand close relatives with more or less ancient history to their credit, and of them all, the poinsettia, or *Euphorbia pulcherrima,* as its Latin adjective implies, is one of the most beautiful and justly popular.

With the exploration of North America and, later on, the cultivation of many of the choice blooms that such travelers as Poinsett brought back with them, the "stoves", as one finds hothouses constantly referred to in the older days of our republic, became enriched with fresh material.

It was soon learned that growing the poinsettia was a matter of considerable skill, as the plant is a tropical one, and did not at first take kindly to the rigors of a northern winter. By maintaining a constant temperature of at least sixty and preferably sixty-five degrees, however, and by guarding the plant from any sudden jar to the roots, it is possible to avoid having the leaves turn yellow.

It is sometimes found that a plant will look quite badly one day, but according to Gardener Kelly, who cares for a large number of such plants in the White House greenhouses, by giving it a little attention and fussing over it, it is often possible to coax the delinquent back to its beautiful yuletide color.

That rich dark green color of the leaves is something of a delusion and a snare, as it is a result of forced feeding of soot, just before the Christmas season opens. The usual color of the leaves is much lighter, and is maintained by a careful feeding of rich soil and manure water.

The hothouse plants are usually cut back to the hard wood right after the holiday season has passed, and by the end of May, sufficient growth of the new shoots will have been made to afford slips which are potted in sandy soil in one inch pots. About six weeks later, these are removed to the next size pot, with a slightly richer soil, always maintaining a heat of around sixty degrees in the hot-house.

Later still, the plants are again repotted, until they are in four or five inch pots with quite rich soil, and finally, just before Christmas, a handful of soot is placed on the top soil to add the dark green color.

With the rapid inroads that are being made into our native supply of wild plants favored as Christmas greens, there is vital need for the use of alternative decorations. Holly and ground pine are facing extinction in many sections, so thoughtless of the future has been the method of their gathering. The poinsettia, increasingly available at the florist's, is proving a popular holiday ornament as well as seasonal gift and in some measure aiding in lifting the burden from the vanishing favorites of yore.

IN THE WHITE HOUSE GREENHOUSE
Gardener Kelly starts cutting back the stock of poinsettia plants after the holiday season

MAGAZINES must be planned well in advance, at least so far as the general contents of the issues are concerned, and the Editors of Nature Magazine have mapped out a strong schedule for the first months of 1929. Carrying out the policy inaugurated with the California issue, the May issue to come has been selected for the presentation of a New England Number. One of our Art Staff spent several weeks in New England this summer painting, and authors have either completed or are at work on articles which will make this issue a worthy companion to the California Number.

Among the outstanding features assured are a group of articles by Arthur Newton Pack on the 1928 expedition of the American Nature Association; a series of stories in which L. Raymond Talbot takes a group of travelling bird-lovers to England, Paris, southern France and Switzerland; four more articles by Alexander Sprunt, Jr., on birds nearing extinction.

Among the contributors during the first few months of 1929 will be Dallas Lore Sharp, Samuel Scoville, Jr., Herbert Ravenal Sass, Donald C. Peattie, Stephen Haweis, Gayle Pickwell, Will C. Barnes, Ben Hur Lampman, William L. Finley, Howard H. Cleaves, Mrs. John Kendrick Bangs, Albert A. Hansen, Tom Gill, Dorothy Pletcher, L. W. Brownell, Edward A. Preble, Charles Fitzhugh Talman, E. Laurence Palmer, Ben East and Hugh Stevens Bell.

In this article Mr. Barnes tells the interesting story of another of Nature's gifts to American prosperity,—a gift only recently appreciated in America

THE FLOWERS OF SPRING, TRA-LA

Have everything to do with the tung oil case, which brings wealth to the Southland

Tung Oil

A New Agricultural Product For Our Southern States

by Will C. Barnes

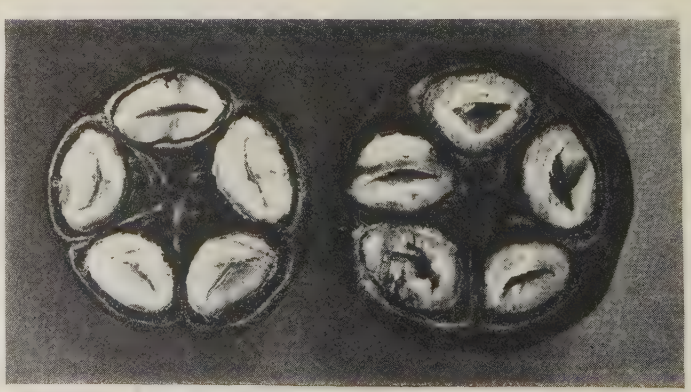
"WHAT do you think about this war in China"? The man to whom this question was put smiled, then, rather cryptically: "Well, as long as it keeps them so busy fighting that they don't get time to produce tung oil, here's hoping it will keep on for quite some time yet".

"What's tung oil anyhow"?, I asked. "Has it anything to do with this tong warfare down in Chinatown"?

Then I learned of a comparatively new crop development in this country involving a product that for centuries past has been absolutely in the hands of the people in a fairly small section of China where climatic and soil conditions were especially favorable to the growth of a tree known to botanists as *Aleurites fordi,* commonly called the "Tung Oil tree", and whose product has had a popular sobriquet of "wood oil".

A few days later he showed me about three thousand acres of these trees growing in the vicinity of Gainesville, Florida, the one spot in all this great country of ours where are most nearly met the peculiar requirements this tree demands in respect to soil, moisture and temperature.

The trees are planted in regular lines and to my inexperienced eyes looked for all the world like a plantation of catalpas without the long string bean ornamentation of the latter.



A TUNG OIL NUT

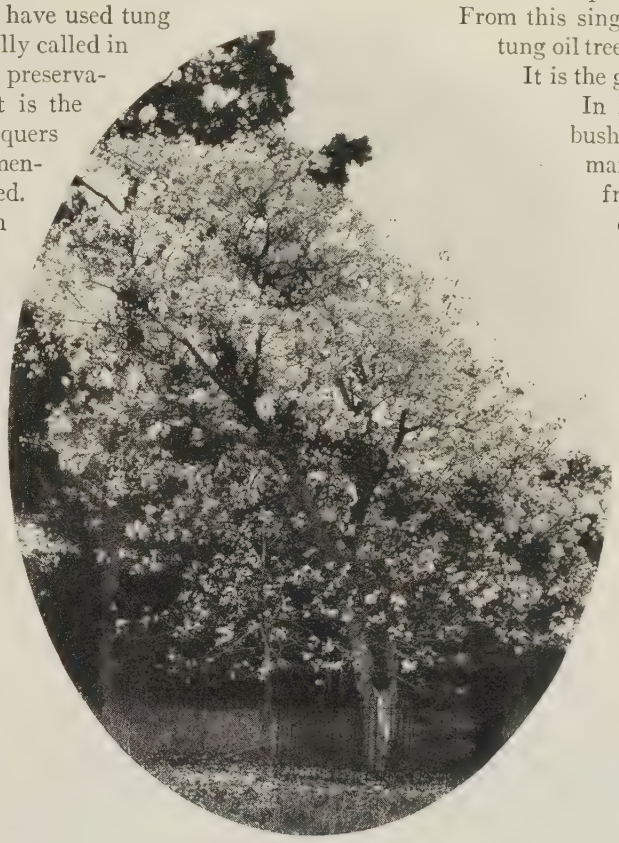
A bushel yields about 2.2 gallons, which paint manufacturers use to get brilliant, quick-drying paints

Here is the botanists' story about this tree, new and practically unknown to us in this country: "The genus Aleurites belongs to the Spurge family (Euphorbiaceae). This large polymorphous family is characterized by a milky latex, a

spongy mass over the micropyle (caruncle), anatropous ovules and seeds containing an oily endosperm".

Just like that the botanists put it. Further on we gather from the gentlemen who are on everyday speaking acquaintance with these impressive words that the Euphorbiaceae family is "kin", as they say in Florida, to the rubber tree, the Cassava, castor bean and croton oil plant,—a family in which at least one member is unpopular, and many others are downright poisonous.

For centuries the Chinese have used tung oil, or wood oil, as it is generally called in commercial circles, for the preservation of wood and paper. It is the basis of the wonderful lacquers with which the pretty ornamental Chinese boxes are covered. They paint their papers with it to render them tough and moisture-resisting. It is also used to make clothing water-proof. A large amount of the local product is used by the Chinese in their own arts and industries, so that the amount reaching this country has never been very large. Its greatest value in American industry is as a dryer in fine varnishes and for putting a wonderful wear and water-resistant filler over floors, furniture and such articles. A bit of wood covered with tung varnish can be soaked in boiling water for fifteen minutes without changing its color or injuring it in any way.



THE FIRST TREE

William H. Raynes owns this parent from which came all the others now aiding Florida

For many years American varnish makers paid little attention to the values of tung oil, the various gums, especially copal, being rather plentiful and fairly satisfactory. Undoubtedly, however, the tremendous development of the auto industry, which called for a brilliant, lasting and quickly-hardening varnished surface, brought about a strong demand for an improved surface covering. The gums were growing scarce, most of them being fossil deposits and rather limited. Chemists investigated the possibilities of tung oil and found it possessed all the needed qualities and some others they had never suspected. Five years ago, it took six weeks to have one's auto resurfaced; now it can be done in that many days and at half the cost. Not only that, but unlike the old finish which could be scratched by a caterpillar crawling over it, tung oil varnishes are about as scratch-proof as a bit of polished steel.

As an agricultural product the plant has come into the public eye within the last six or seven years and then only to a very limited extent. In 1905 the explorers of the United States Department of Agriculture obtained a few seeds of the tree and seedlings were distributed to persons in certain areas where it was hoped they might prosper. Five of these seedlings fell into the hands of Mr. William H. Raynes of Tallahassee, Florida, who in November, 1906, planted them in his yard in that city as an experiment. Only one survived and that seedling, which has become a tall tree, is still growing. Like the original navel orange tree at Riverside, California, another "find" of the explorers of our Department of Agriculture, this old tree at Tallahassee is enclosed by an iron fence to protect it from any vandalism. From this single tree has descended all the tung oil trees now growing in this country. It is the great-grandfather of them all. In 1913 Mr. Raynes shipped a bushel of the nuts to a paint manufacturer in New Jersey, from which 2.2 gallons of tung oil were squeezed,—the first simon-pure American product. It was not until about 1918, however, that the commercial possibilities of the tree were taken up. Previous plantings along commercial lines in the vicinity of Tallahassee had not succeeded, due undoubtedly to obviously unsatisfactory climatic conditions. About 1918, however, Mr. B. F. Williamson, a wide-awake lumberman and land owner of Gainesville, began a study of the tree and decided that the region about his city offered almost ideal conditions for its growth. Also he saw in it the possibilities of a brand-new industry for his State. A vast amount of research into all the known literature on the subject developed several points of importance.

It was found that the young trees cannot survive a temperature much below 18 or 20 degrees Fahrenheit. Mature trees will withstand much colder weather, but the seedlings are extremely tender and easily killed by cold. The moisture requirements of the trees are high and they call for an annual rainfall of not less than forty or fifty inches. They thrive best in an acid soil, which must be deep, light and containing a large amount of humus. The soil must be well drained for, while they insist on plenty of moisture, apparently the trees object to having wet feet. Lastly, the young trees are easily killed by hot drying winds.

The area about Gainesville is very different as to soil and climate from most other sections of the state that made Ponce de Leon famous. It lies in what is known as the "hummock" section of the state, where instead of the tiresome white sands of the "flatwoods" sections, there is a real soil, rich in humus, well-drained and extremely fertile.

It's a lovely rolling timbered country, not unlike some

parts of Iowa. Studied from every possible angle,—soil, rainfall, drainage and temperatures,—Mr. Williamson satisfied himself and his associates that the Gainesville region was the one single place in the whole United States where tung oil trees could be grown on a profitable commercial basis.

Today, thanks to his enterprise, the American Tung Oil Corporation, an organization fostered by the American Paint and Varnish Manufacturers of this country, has some three thousand acres of these trees which are now bearing and are producing increasing quantities of this valuable oil.

The trees begin to bear at three, but do not reach their prime until eight or nine years old. They are planted in regular spacings, thirty feet between the rows and twelve feet between each other, but are later removed as they spread out until they stand twenty-five feet apart. There are about sixty to the acre,—a proper spacing for aged trees.

An average acre of nine or ten year-old tung trees will produce about four bushels of the unshelled nuts to each tree or about thirty pounds of oil apiece. At this age the crop will bring two hundred dollars an acre at present values.

The oil, by the way, is sold by the pound, weighing approximately eight pounds to the gallon. The blossoms on the trees remind one strongly of the lovely dogwood blooms, while the leaves are a deep green, very large and heart shaped. Their appearance won them their name, as "tung" means "heart" in Chinese.

The trees call for considerable care and fertilizing up to six years of age. Commercial fertilizers are used while cover crops, such as cow peas, beggar weed and crotalaria are grown between the rows and turned under every year to furnish the needed organic matter. The nuts grow in groups and in color, size and texture of the outside shell resemble closely the black walnut of our Middle West. They are not harvested, but are allowed to drop from the trees to be picked up and sacked as opportunity offers. They do not deteriorate on the ground. Each shell has from three to five large white seeds which contain the oil.

So far as is known the trees are not subject to any disease or insect pests. Stock will not browse on them due probably to some objectionable flavor in the leaves or twigs.

The industry offers an almost unlimited field for development as the demand for the oil is heavy and always increasing. Land suitable for the purpose is valued at from sixty dollars to one hundred dollars an acre. Mr. Williamson believes the best and most profitable results will come to the individual farmer who follows mixed farming and devotes a portion of his land to tung trees, whose demands and harvesting come at times when his other crops are "laid by".

As such, this infant industry offers a new field for Florida agriculturists and possibly for those in other sections of the Southern States along the Gulf. It will add millions to the wealth of the Southland. And adverting to the war in China, Mr. Williamson and other planters believe firmly in the old saying about "an ill wind". It blows them much good.

MONEY ON TREES

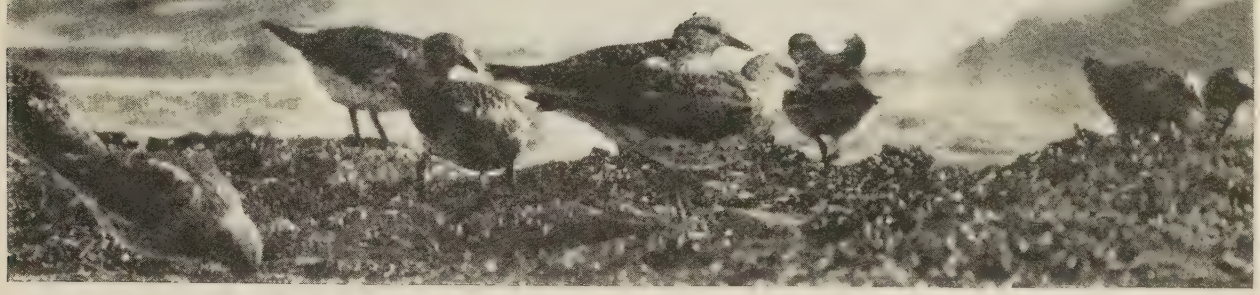
China is our only rival. The temperamental trees make many climatic demands

READY FOR MARKET

From 109 trees came 5,500 pounds. The crop is worth about $200 an acre

The SURF BIRD OF MYSTERY

by William Leon Dawson



Some three years ago we acquired a group of articles by the late William Leon Dawson. This is the last of the series and was written before the mystery of the surf-bird had been solved and his nesting place discovered. This last event was recorded in the September, 1927, issue of Nature Magazine by Professor Joseph Dixon of the University of California. In view of the delightful writing for which Mr. Dawson was noted, and the fine photographs, we are reproducing the article as he wrote it for us.

The photograph below, however, shows the nest and eggs of the surf-bird, and was taken by Joseph Dixon in Alaska. There the University of California ornithologist achieved what Mr. Dawson says he would rather have accomplished than to have the Spanish crown.

EXPERIENCE has shown us that when we have learned nearly all there is to be known about the habits of any given species of bird, we dismiss that species from attention, and turn henceforth to fresher interests. On the other hand, if we catch only fleeting glimpses of a bird, or if we suspect that he is withholding from us so much as a single chapter of romance, let alone a history of life lived under far different conditions, our curiosity is piqued, and we glean with feverish interest any scraps of information which may lead to the unraveling of a mystery. It matters not how prosaic is the subject of our inquiries, nor how non-committal is his conduct under inspection. Your bird-lover is a born detective, and although we eschew the implements of our craft, the flash-light and the gun, in imagination we are Holmeses, and a bird whose history is unwritten is a challenge to every professional instinct. We will learn the truth, and all of the truth, about that species, though it take us from pole to pole.

Of all avian mysteries few have so teased the imagination or baffled the inquiries of men as that of the surf-bird, *Aphriza virgata*. We have known it for a hundred and twenty-five years as a more or less casual migrant along the Pacific Coast of the Americas. Casual is hardly the word either, for a favored few among the increasing number of western observers know that the surf-birds are likely to turn up at certain favored points with punctual regularity year after year. But those favored points are few, and there is nothing about the behavior or language of *Aphriza virgata* to attract popular notice. The birds are rather phlegmatic, not too suspicious—as are those whose confidence has been often abused—but rather intent on business, children of another destiny, whose urges and whose orbits we do not comprehend. Ah, that is it! What right have these migrant surfmen to ignore us, to taste joys that are foreign to us, to whisper reminiscences in a foreign tongue? Sirrahs, we will join your company, by your leave or no. We will spy upon you, and we will track you over the pathless wastes until we find your hidden bivouacs, be it upon mountain slope of Alaska, or upon pitiless Arctic shore.

The pictures here presented tell of an hour of privilege which the author once enjoyed, a self-invited guest at a local banquet given in honor of these travelled gypsies. It was on the third day of May, the normal time for northern passage. The surf-birds, twenty-three in number, may have hailed from Magellan, or they may have been loafing the winter out among the reefs of lower California. At any rate, here they are, deployed over the outermost ledges of a tide-swept point some

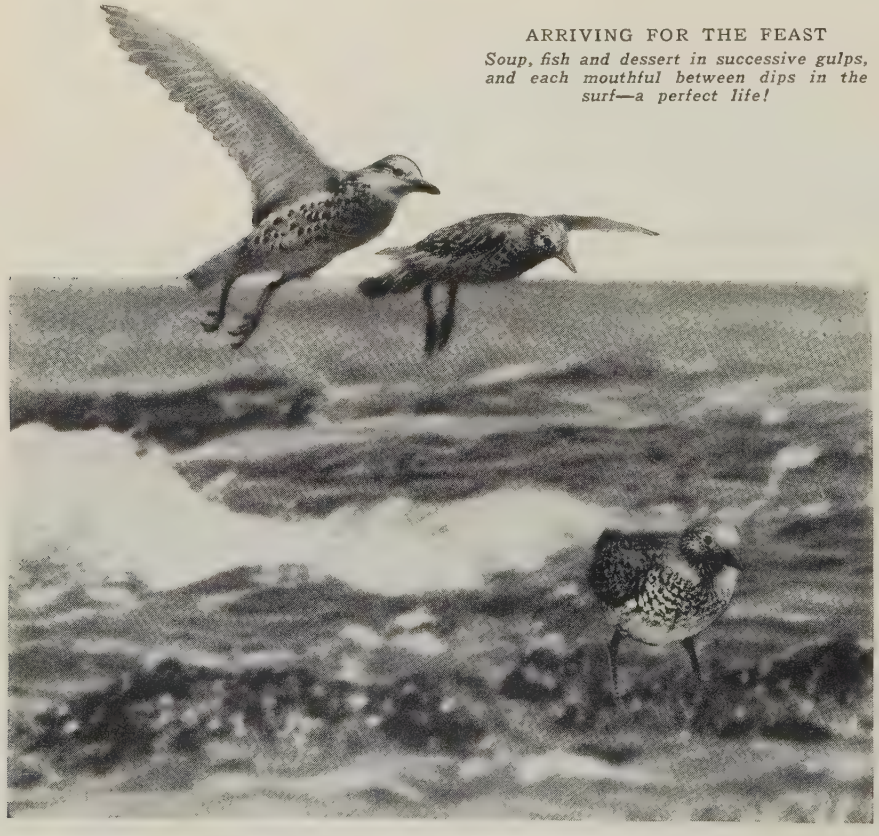
A SANDPIPER POSE

Not understanding why humans should disturb their salle à manger, *the surf-birds retire down the beach for conference*

miles from Santa Barbara. The rocks, now exposed by the tide suck, now buried by a crash of spray, are teeming with life,—barnacles, holothurians, and their ilk. The surf-birds are intent upon feeding, for low tide is imperative meal time—soup, fish, and dessert in successive gulps, and repetition in reverse order when the next wave is past. A single black turnstone, a distant kinsman, has joined the group, and the Aphrizids treat him kindly, although he does not seem to understand their signals. Once, when some surf-birds rose, the turnstone stood his ground, bewildered for a moment, but then, knowing that his judgment must have been at fault in the face of such a unanimous decision, he fled in terror.

Not elsewhere have I seen such infallibility of judgment regarding the behavior of the sea as that displayed by these surf-birds. It was tussle and flit with them; yet they never seemed to be in a hurry. Theirs was always the ease of mastery. If the water was only to be belly-deep, they knew it, and stood patiently till the silly fluid retreated; but if the wave was to go higher, the birds lifted and settled as nonchalantly as so many corks. And when the comber came, the birds were in the spume, but never in the crash. Could one picture anything more romantic! surf-bathing and dining at alternate moments, a sort of *thé dansant* without any danger of indigestion.

The photographer all this time—the erstwhile sleuth, you remember—is praying devoutly to be forgotten. He has resolved himself into a peripatetic armadillo, a sort of man-and-beast combination, of which a box camera is the cherished core. There is no cover on the shameless sand; but a travelling limpet, even though gigantic, will occasion less comment—among shore-birds—than the meekest of men. I am at close quarters now, and my heart has almost ceased beating. Snap goes the button and roar goes the shutter! The birds are uneasy, and there is murmured complaint. A timid one rises, but is recalled by his fellows, and mollifies himself forthwith with a beaker of cirriped paste. Roar goes the shutter again! Really, this is too bad! The diners remove themselves with gentle dignity and retire upbeach to discuss the situation, and to deploy over the sands. They look now for all the world like sanderlings,—just a bit less agile, perhaps, as they patter and probe and glean. But the deserted sleuth is heart-broken. Whatever shall he do to atone for his bungling? These élites of the bird-world offended by a saucy shutter! It is insufferable.



ARRIVING FOR THE FEAST

Soup, fish and dessert in successive gulps, and each mouthful between dips in the surf—a perfect life!

"Oh, well, after all, this sand is not so very profitable. What do you say, Aphrizæ, shall we go back to the *salle à manger*"? Agreed! And so the photographer, wet to the middle now, but with lens undimmed, is adopted into the Ancient Order of Surf Banqueters this glorious day, and

THE THRILLING GAME

Birds and water fence and play, yet never do the combers engulf them, or the backwash catch them unawares

he brings away favors the rarest and the choicest of their kind, favors which he would not exchange for a Straight Eight and a spare. Behold them!

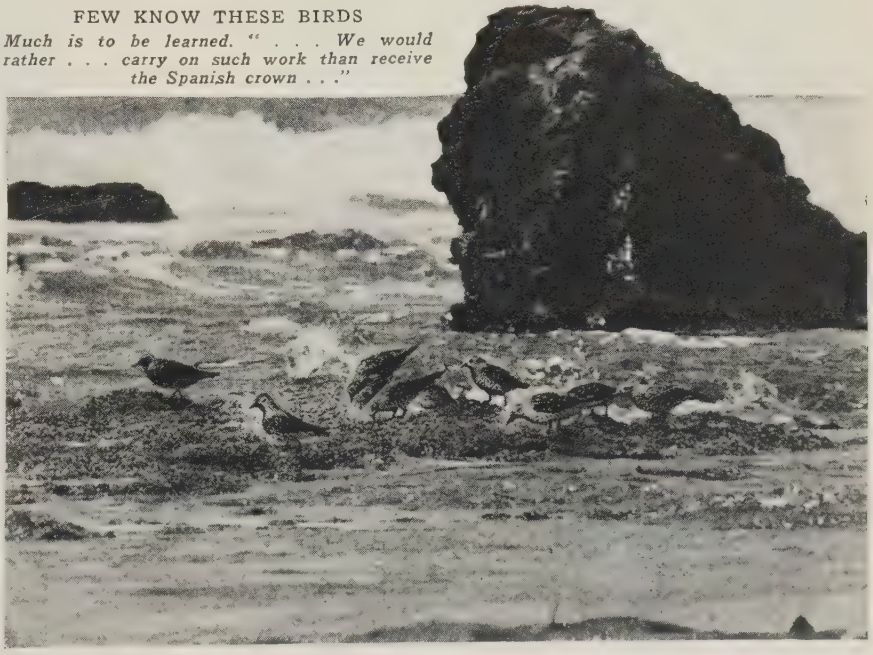
The discovery on July 13, 1921, of a surf-chick—or must one say a surf-bird chick?—on the upper reaches of McKinley Creek, a tributary of the famous Forty-mile River, in the Kechumstuk Hills of east central Alaska, brought to book a significant chapter in the home life of this elusive bird, whose very whereabouts in summer had baffled inquiry for a century. Mr. O. J. Murie, in the service of the Biological Survey, was the fortunate discoverer, and his account, published in *The Auk*, gives us most of the little we know about the breeding range of *Aphriza virgata*. Besides this near-Klondike record, the observer saw surf-birds in summer near Fairbanks, and others, possibly non-breeders, at a point well above timberline in the Alaska Range. Dr. Joseph Grinnell also saw surf-birds on the 29th of May, 1889, in the Selawik Mountains of northwestern Alaska, and his Indians assured him that they bred there. We may assume, therefore, that the surf-bird of mystery breeds exclusively in the highlands of interior Alaska; and that the fullest details of his domestic life await the careful explorer who is willing to spend a season in the quest. The pioneer sleuthing has been done, and the official report of Pinkerton Burns Murie has been accepted and filed. For ourselves, we would rather accept a commission to carry on such work than to receive the Spanish crown.

Professor Dixon was the explorer to whom fell the privilege of discovering the surf-bird who had, he says, "become a sort of Holy Grail among birdmen". Five pilgrimages in seventeen years he made to Alaska on this quest, finally, by process of elimination, concluding that the bird must nest somewhere in the mountains of central Alaska. In the spring of 1926, accompanied by Mr. George W. Wright, and with the support of the University of California and Col. John E. Thayer of Lancaster, Mass., Dr. Dixon took up the trail again. Entering McKinley National Park, the explorers first sought the birds along the river bars without result and then went upward past the timber line. On May 28, toward evening, Mr. Wright's attention was attracted by a grayish bird sneaking along over the rocky ground. As he watched with his binoculars it disappeared; but upon his going to the spot where the bird was last seen, he almost stepped upon it sitting on its nest and four eggs. His eyes were the first of which we have written record that ever gazed upon the nesting surf-bird.

Hours of careful observation of the nesting habits of the bird followed and photographic evidence of the great "find" was brought back to delight the ornithological world. It was found that apparently the father bird assumed the responsibility of the home and was a well-trained care-taker of his offspring. The birds also had a way of "exploding" suddenly to startle any passing mountain goat away from the nest. So, at last, was found a rude nest on the rocky mountainside of Alaska, far from California's shores, and the mystery of the surf-bird was solved. R. W. W.

FEW KNOW THESE BIRDS

Much is to be learned. " . . . We would rather . . . carry on such work than receive the Spanish crown . . ."



Normally Enemies, But Not Here

Try to Duplicate This One

On these two pages is presented one of the most remarkable groups of pet photographs we have ever seen. They are all taken by Mrs. Joseph Watson and are of her varied and wonderfully-trained barnyard menagerie. Buck, the dog, Mrs. Watson says, was a tramp before he settled down with her. The squirrels came to her before they had their eyes open.

"How's the Water?"

A Lesson in Geography

Buck and Oswald

Proud and Unafraid

A Canine Mouthful

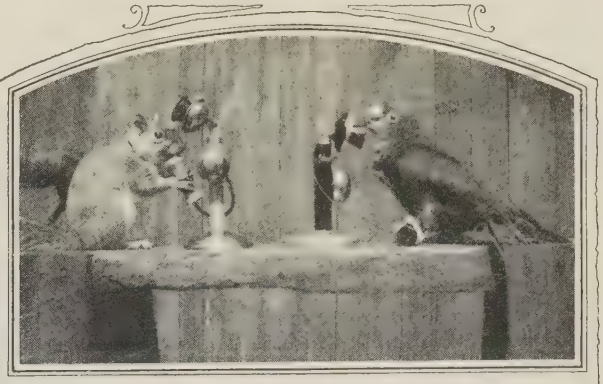
"Hail, Hail, the Gang's All Here"

Trying to Reach a High C

The crows were given to their mistress as babies and brought up on bread and milk. Pepper, the cat, was so wild that a neighbor was about to dispatch him, but Mrs. Watson came to the rescue. The pony is Daisy and the parrot, Paul. The rooster answers to the name of Joey. The fox is still wild and nervous but poses quite well. All together they make a wonderful family, none of whom is the least camera-shy.

Running the Scale

A Balancing Act



On a Party Line

A Mixed Foursome

A Barnyard Jinrikisha

The DESERT TORTOISE

An Example of Unusual Adaptation

by Vernon Bailey

Chief Field Naturalist, U. S. Biological Survey

This article by one of the members of our Scientific Consulting Board is a valuable companion article to that on the Galapagos turtles in our November issue.

A DESERT HOME

From his resting place two or three feet underground the desert tortoise, protected like an armored car, comes out for his food

THE race is not always to the swift nor the battle to the strong when it comes to the evolution of a species. More often it is the slow and perfect adjustment to existing conditions, or adaptation to environment, that insures the perpetuation of each after its kind.

Long before man or any of the group of warm-blooded mammals began, the slow turtles walked this earth, and many different kinds are still walking or swimming without great haste or speed over various parts of the earth's surface. They have had plenty of time during the millions of years to adapt themselves to advantageous modes of living, from fin-footed swimmers in the ocean to elephant-footed denizens of the desert, and they bid fair to be with us for a long time to come, unless destroyed by our own greed and thoughtlessness. Without fur or feathers to excite our avarice they still have one great danger; most turtles are excellent food, even for man, against whom Nature did not adequately arm them, and many species even now are in danger of extinction.

One, however—the desert tortoise—will be with us until man has conquered the desert. The spiny cactus, the thorny mesquite and the leafless allthorn are not more perfectly adapted to desert life than these big thick-shelled tortoises that occupy the driest, hottest, and least habitable parts of the lower Sonoran Zone valleys of southern California, Nevada, Utah, Arizona, and western Mexico. We generally think of turtles in relation to water but these big desert rovers rarely—some perhaps never—see any water. It is surprising to come upon one on some dry slope where there has been no rain for a year; to pick it up for a closer examination and have it crawl into its shell so tight that it squeezes out half a pint of clear, clean water. That is what happened the first time I ever saw one, thirty-seven years ago at the edge of Pahrump Valley in southern Nevada, twenty miles from any water. It puzzled me for many years.

Last fall at the Brisbane Ranch in the Mojave Desert we found these turtles fairly common and learned something of their habits, just enough to suggest a big field for study.

We found one big tortoise out for a walk on a fine, warm October day, but all the rest had gone into their burrows for the winter. This, however, was up at 2,000 feet altitude where the nights were then almost frosty and most of the cold-blooded animals had sought their winter quarters. Other tortoises were found in their burrows, where they stayed until late February or early March. We did not learn whether they become fully torpid during the winter, but probably they do. Those we dug out in

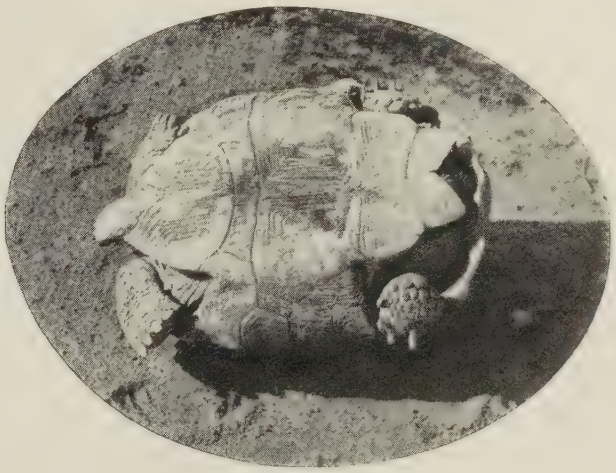
HOAG AND FORD

NOT VERY SOCIABLE

Though these three have been brought together by humans, usually they walk alone. They are gentle creatures

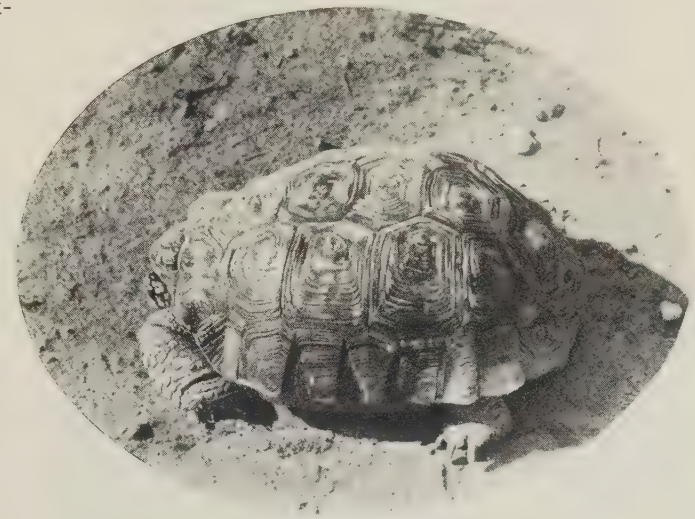
November were sleepy and slow, and when brought out of their burrows would sit still or walk slowly about to find a hole to crawl into.

They were easily found, because a turtle burrow is half-moon shaped, not full-moon, as the burrows of badger, fox, or coyote. With a long stick we could reach in and feel the hard shell of a turtle down two or three feet below the surface and four to six feet back from the doorway. A few thumps on its hard shell would sound very different from the soft thud of an empty burrow, and once located Mr. Turtle was easily dug out. One was needed for a specimen for the U. S. National Museum collection, and two were shipped alive in a comfortable box to the National Zoological Park for further study. The specimen was a good-sized tortoise, weighing twelve pounds; the shell measured a foot in length and was nine inches wide. Others have been reported much larger, but statements of their being seen as large as a washtub are probably exaggerated.



UP-SIDE DOWN AND RATHER HELPLESS

Below he strolls over the hot sands. Man is his worst enemy, because his flesh is edible, and his stored water sweet and fresh



If the prominent ridges around the plates of the shell are rings of annual growth, as they appear to be, the one saved for a specimen was about sixteen years old and a smaller one weighing six pounds was nine or ten years old. More careful study of the shell ridges in relation to age is important. If the turtles live to be two or three hundred years old, as some species are said to do, they may show as good an index to desert climate as do forest trees in other parts of the country.

The shells of well grown tortoises are so thick and rigid as to be proof against most of their enemies, even the coyote, whose tooth prints Frank Stephens has found marking them in long scratches. The young are an easy prey, but against most enemies except man the older animals are well protected. Even the feet and legs when drawn into the shell show only hard and horny surfaces, closing the doorways, while the horny snout drawn well inside protects the soft body back of it. When closed up the tortoises are veritable little tanks, or armored cars,—all for defense and not aggression. Even when caught and teased they rarely offer to bite, and when tamed show very gentle dispositions.

These tortoises are strictly vegetarians, eating quantities of green grass and succulent plants. The Brisbane boys told me of seeing them eating big mouthfuls of bunch grass and showed me the stubble where it had been eaten off near the burrows during the summer. The Dodge brothers told of tortoises eagerly eating green alfilaria, alfalfa, and other such plants, and drinking from the puddles after a rain. They are said to eat cactus, but I was not able to verify this.

The stomach of the one saved for a specimen contained a great mass of stems and leaves and roots of plants, largely grass, some *Cassia armata, Eriogonum,* wild mustard, a small *Euphorbia,* and other material not so easily determined. The many large oval pellets of the turtles along their trails were all made up of the indigestible parts of plants, largely grasses. Great quantities of green food are eaten, and the dry pellets carry away but little moisture, so all the excess water of the plants is retained in the system, and apparently accumulates in the body cavities. There can be little loss from perspiration or evaporation in a desert tortoise.

The bladder of one, saved for a specimen, contained nearly a pint of clear water, though when first picked up it had lost some water. In a pen for several days the animal had often left wet spots on the floor. There had been one light rain a few days before it was captured, but this was at the end of a long dry summer, and the water stored up inside was evidently intended to last all winter. There was much moisture in the internal viscera, but I could not locate the two water sacks said by some writers to carry a water supply inside the shell nor did I find the pericardium filled with water around the heart as has been reported in its near relative, the big Galapagos tortoise, which goes for months without drinking.

When it becomes necessary to kill an animal for

scientific purposes the collector should recognize the duty not only to prepare a perfect specimen that will yield all possible information to future generations of students, but should gather from critical external and internal examination of the fresh body all the facts of the animal's anatomy, life-history, habits, adaptations, and possible uses that can be learned from such examination. In this case a perfect shell, skin, and skeleton of the turtle were saved; the contents of the stomach and intestines were preserved for more careful food study; notes were made on internal conditions, water supply, fat, glands, and muscle; and besides all this about four pounds of good solid meat was saved, cooked, and served to twelve persons, first as a clear turtle soup, as delicious as the finest chicken broth; then as delectable creamed turtle on toast.

And herein lies the great danger to this interesting desert dweller, for ages an important article of food and possible source of an emergency ration of water for thousands of generations of native people. At the winter camps of the Mojave and Piute Indians many old turtle shells may be found, some in use as bowls or baskets, some broken and thrown away, but all having first provided a feast to hungry people.

As has often happened in the Galapagos Islands where a turtle is squeezed and a drink of good water obtained where no other fresh water is to be had, a good drink that might save human life could invariably be obtained from one of these desert tortoises. A feast also is at hand if one knows enough of the ways of the wild to take advantage of it.

The desert has no terrors for those who know its secrets, and on every hand it teems with fascinating forms of life, with thrilling interests, and wild beauty, found nowhere else on God's green earth. May it long remain a desert for those who know and love it.

LEGION SHRINE

Among the First of Veteran Conservation Projects

PAUL GREIDER
Legionaire Deputy Game Warden, on guard at the Wisconsin legion refuge

IN THE heart of the lake and forest region of Wisconsin, through the entire extent of a thirty-five hundred acre tract, wild life is hunting, travelling, propagating with no danger from trap or gun. It owes its safety to the men who, a short ten years ago, were lending their greatest powers to the forces of destruction, for its harbor is the American Legion Wild Game Refuge, the land for which was recently deeded the Wisconsin Department of the Legion by the Badger State.

BEAVER LODGE, LOST LAKE
Nine lakes like this, and five larger ones, break the forest stretches in the preserve. An ideal sanctuary

The area, strewn with lakes and forests, and considered ideal for a wild life preserve, is more than a refuge, however, —it is a monument marking one of the first steps which the American legionaires have taken to carry out a new major activity, conservation work. It is an example of what may be expected from these men who, at their national conference at Paris, determined to bend their energies to decrease the despoliation and dissipation of national resources.

All the animals that are native to Oneida County, where the preserve is located, roam in the sanctuary, and many varieties of song birds have gathered. Nine small lakes, entirely within the refuge, and five larger lakes, on the boundary line, offer ideal conditions for game birds. Wild rice and other foods have been transplanted into the lakes. Deputy game wardens, employed by the Legion, keep away hunters and trappers.

The Legion is not content to rest with wild life protection—it is carrying out a tree planting program that covers several years. More than fifteen thousand pines were planted last spring by veterans, aided by Boy Scouts, and second growth was cut away in some localities to free young pines. A few years, sponsors believe, will bring the conviction to the world that the Legion tract is one of the best game refuges and examples of careful reforestation existing in the West.

This is one of the first steps—though much more than a toddling, infant one. The Legion has discovered a field in which it can be of great influence. And the cause of conservation has found a St. George, who will help kill its dragon, or at least, make it very sick.

WHITE WALLS OF LIMESTONE SET OFF THE ROYAL PALMS

In the Valley of Vinales

There is the Land of the Magotes and Bottle Palms

by Hugh Hammond Bennett

To the connoisseur in matters of the sort the chief claim to fame of the Province of Pinar del Rio in western Cuba is that it produces the most fragrant and highest-priced tobacco known. Whether he be in London, New York or Hongkong, this person will seek those superlatives of cigars made from a leaf grown in the sandy soils of the Vuelta-Abajo. Cigars, however, soon go up in smoke, but he who seeks the beautiful and unique in scenery will find it in this western province—and the memory lingers on.

Let us take the road that leads from the city of Pinar del Rio to La Esperanza on the north coast, and be prepared for one of the most charming sights in the western hemisphere. Suddenly we come to the rim of the piedmont hills and before us lies the fertile Vinales Valley, dotted with tobacco farms and their palm-thatched buildings. It is a prodigious, level sunken garden, and across it stand strange structures swathed in softest blue and pale-purple, looking, in the distance, like etchings of Rhine castles. They rise from the floor of the valley with almost perpendicular walls, often rearing more than one thousand feet. Here and there are narrow defiles between these natural monoliths, astonishingly like the street canyons of New

PALMA CANAS

Rather stiff and unapproving they seem, with their feather-duster, ramrod appearance

York. Over all there is a pervading peace and beauty.

These strange structures of Nature's building are the magotes, a part of the Cordillera de Guaniguanico. They have been carved from the limestone by ages of rock weathering. Some of them have flat tops, reminiscent of, but not like, the buttes of the Great Plains. They are, however, quite unlike any other mountains lest it be the Dolomites of Europe.

Lured by the charm of the scene before us, we descend to the valley and stop for lunch at Vinales, with its buff-colored, tile-roofed cottages and streets blood-red with the prevailing clay. Continuing northward we enter a mountain pass of matchless charm. At one bend in the road a huge silk-cotton tree comes conspicuously into view, standing at the entrance to the pass as though stationed to guard it. We come to the feet of the lofty cliffs and find them honeycombed with caves, their outer walls streaked with lime gathered into stalactites. Within the gaping mouths of the caves hang huge icicles of solid lime rock, and fellow stalagmites climb upward from the floor.

Not merely a cavern or two do these great blocks of stone afford, but thousands. At one place the Ancon River, having come past the fair village of Vinales, makes for the foot of Sierra del Vinales, and pauses not to circle the commanding bulk but dives beneath the mountain through a natural tunnel of more than a mile. Emerging, sparklingly cool, on the other side, the little stream makes off northwest toward the Gulf of Mexico. This river and others are gradually undermining the great rock masses and cutting at their bases, in which moist situations flourishes a lush tropic growth.

Sierra del Infierno, or Hill of Hell, they call the largest of these magotes, doubtless for the dark depths of its bat-infested caves. At one time there must have been many huge natural bridges and undermined table areas in the valley. The ages, however, have seen unequal dissolution of the lime rock, carving the mountains into blocks and letting the upper stratas down into caverns to decay or wash away. As the geologists reckon time, it will not be long before these mountains will pass away, leaving in their place a normal valley floor.

We pause beside a vertical wall of rock and crawl inside to solve its mystery. We are in fairyland. Before us is perhaps a quarter acre, its flat floor grown with magnificent royal palms. There are shrubs of various tropical plants, a few bananas, and, in the center, a child's play house. Shadows from gently-waving graceful fronds of the palms move back and forth against the white background of limestone cliffs. Birds flit from

BOTTLE PALMS IN THE VINALES

Silently they stand at attention, ridiculously obese, while solemn gigantic monoliths, honeycombed with caves and dazzling chambers, rise like Rhenish castles to guard them

tree to tree, singing in the sunlight which filters joyously through the cool, green canopy.

We find another beauty spot, this time a high-roofed cavern at the foot of a cliff that towers a thousand feet above. Drops of water make music as they fall, the bass supplied as they strike the resounding floor, a sweet resonance uttering when they fall upon growing stalagmites, and the drumlike note chiming in as they splash upon the broad, tough leaves of palms.

Though they be of almost solid rock, the magotes bear small palms and green-boled silk-cottons in the cracks and crannies of their sides. The tall silk-cottons often stand at weird attention aside the stalactite streakings of the cliffs. Birds, also, find haunts in the magotes, and often paroquets and common Cuban birds are seen. Buzzards nest among the high-flung rocks, and bats make homes in the caves, leaving rich fertilizer for the fields.

We turn from the mass and mystery of the magotes to smile at another of western Cuba's curiosities,—the bottle palms, known to the natives as *palma barrigona* or belly palm. The Cubans have named them well, for never was there such a conspicuous tummy, such a nice, round, fat one. They are human sort of trees, a forest of them looking like a fat men's convention standing around in the lobby of the hotel before going into a ten-course meal. You laugh at these comical trees and almost expect them to fall jovially into the spirit of the moment and laugh with you.

Hardly can these trees owe their obese condition to gluttony since they grow in sandy soil of such native leanness that their bulge would seem rather to come from straining to draw food from the niggardly ground. Many of them are like scarecrows with only two or three leaves left atop them, the rest of their adornment having been gathered by natives to make thatch. No spines forfend this and the trees are easy to climb. Still, many trees have been cut to save the slight effort of climbing for their leaves. These fronds make fine and durable covering for the tobacco barns, lasting some twenty years and taking up the heat slowly and distributing it evenly. They serve better than shingle or metal roofs, so, funny as they are, these rotund members of the palm family serve nobly in the economic system.

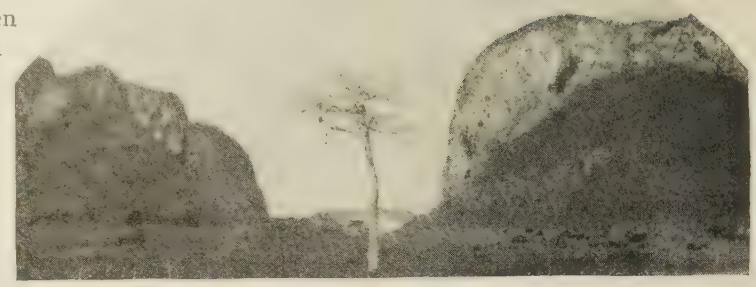
In middle Cuba there is found a relative of the bottle palm known as the corojo palm, but its tummy enlargement is more elongated and many of the trees boast thorny spines. Its leaves produce a useful fibre and its

LIKE GUARDS AT BUCKINGHAM

Rise the palmas jatas da Guanabacoa. Below are the fields of tobacco and the royal palms that make the piedmont of western Cuba a great, green paradise

fruit is edible. A taller palm seen in the hardwood forests of the coastal plain in southern Santa Clara and Camaguey, also has a swollen bole high up beneath its crown of shorter and stiffer leaves. Here and there atop the magotes were found the jata de Guanabacoa palms, like giant feather dusters, their leaves thrust out stiffly like the hair on puss's tail when the neighbor's dog drops in to call. But the palm that gets the palm for sheer friendliness is the bottle palm.

So we leave the beautiful valley of Vinales, its wonderful monoliths and friendly trees, its thatch buildings and far-famed tobacco fields, and take again the road to La Esperanza. Truly it is a beauty spot worth coming far to see.



AT THE GATES OF THE VALLEY
There is a silk cotton tree, a sentinel before the cliff-darkened pass which leads to the Vinales Valley

THE COLLIE

by Josephine Z. Rine

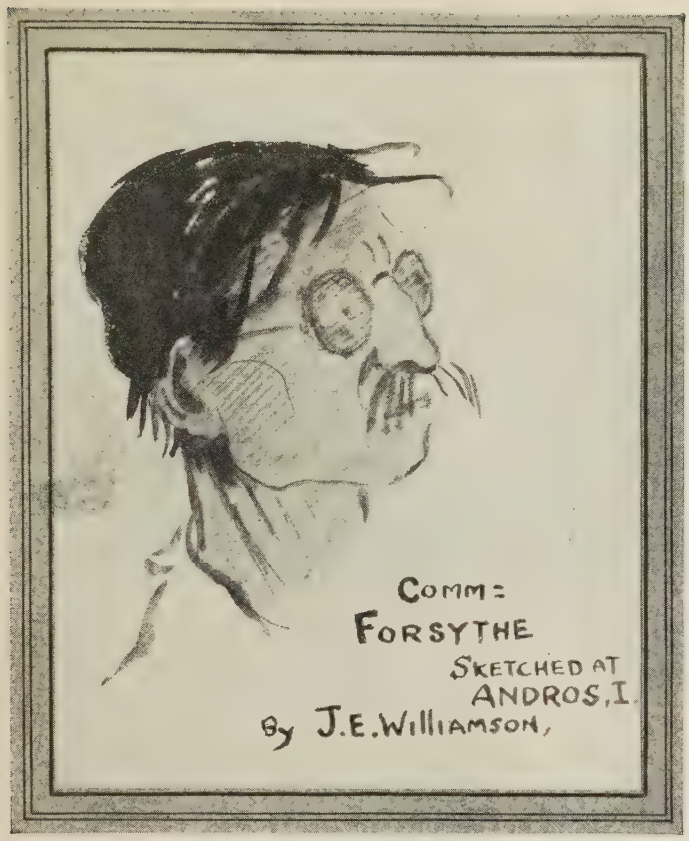
One of a group of short articles on dogs by this author

THE collie or Scotch sheepdog, one of the oldest breeds in existence, is probably the fountain head from which all shepherd types have sprung. The name comes from the Anglo-Saxon *col* meaning black, referring to the black-faced sheep of the Scottish Highlands, and in its later form, *colley*, signifying sheep. Almost as far back as records go, the sheepdog has been the constant companion of the shepherd and his flock. England, Wales and Russia all had their sheepdogs, developed differently according to the climate, the type of land and the breeds of sheep herded. But the work of all was the same; they guarded sheep and shepherd both and out of the largeness of their responsibility came a mentality rarely equalled in the world of dogs.

The work of the collie gave him the manner and disposition that he has today. He is restless, for centuries ago he was always on the move, rounding up his charges and nosing back into the fold those that strayed too far. For this reason he does not go directly at anything; he goes round as if the pull of heredity bade him always travel in a circle. When he fights he does not hold fast; he merely nips here and there as if the past had taught him that small animals are weaker than he, hence require mild chastisement rather than real injury. But he is a staunch protector when need arises, and he fights furiously when once aroused.

DESCENDANT OF A RACE OF CARE-TAKERS
International Champion Bellhaven Laund Logic owned by Mrs. F. B. Ilch, Red Bank, N. J.

He is big and powerful, and his profuse, two-ply coat defies wind and weather in any mood. His legs are straight as arrows, fine-boned but strong. His head is long after the fashion of the sheep tenders and of those dogs that have not been perverted away from their naturalness. His ears are up and over at the tips to catch the veriest fraction of a sound. His eyes are small and bright and farther seeing, probably, than those of the great majority of his race. And such popularity as this must be deserved.



ELGIN W. FORSYTH

He Knows Flamingoes by their First Names

by Don Moore

Photographs by Warden Forsyth

At the moment this article was being gotten ready for publication came the devastating hurricane. Its fringes struck the Bahamas and concern was again felt for the flamingoes. Attempt was immediately made to get a report from Warden Forsyth but owing to the difficulty of communication no word had been received up to the time of going to press.

One white man stands between hundreds of meat-hungry negro sponge fishers and the only surviving colony of flamingoes in North America.

Elgin W. Forsyth was born forty-six years ago in the Bahama Islands, just off the Florida coast, where his father and uncle had settled after adventuring in California, Africa, the Spanish Main and way-stations. As a boy, Elgin went to Florida to complete his schooling, and then worked for years in American shipyards. He was an expert shipbuilder when he returned to his father's home on Andros Island.

But Andros, one would think, offered small career for the young man. The island, some one hundred miles long and from twenty to forty miles wide, consists of solid masses of sharp, jagged "honeycomb" rock, and marshy plains of barren marl. There are no roads, no good harbors; not another coast in the world is more dangerously sown with shoals, reefs and wicked submerged rocks. A dozen whites live in the scattered settlements along the eastern beach, where some seven thousand brawny, full-blooded negroes, descendents of African slaves, eke out a scanty, lazy living. On their "farms", mere pot-holes in the solid limestone, they raise a little corn, pigeon peas and sweet potatoes. The only industry is sponge-fishing.

Coming from a family of globe-trotters, young Forsyth might have been expected to seek his fortune in a more promising land. Instead, he married and settled down on Andros, living in a two-story house,—a great distinction on Andros,—that overlooked the curving palm-shaded beach. His wife's nearest white woman neighbor lives at Fresh Creek, a thirty-mile journey by boat from Mangrove Cay. Forsyth built boats out of the native madeira and horse-flesh, drained the swamps in front of his "town", and acted as government commissioner (judge, mayor, postmaster, chief of police, and what have you!). Mail from Nassau and the outside world came twice a month, if it did.

Seemingly Forsyth was buried for life on his out-of-the-way island. But there, right in his own back yard, he was to find the work that has won him many honors and international recog-

BEAUTIES OF NATURE
The pinkish, slender-legged, stately creatures make picturesque a land of desolation

PERSECUTED CREATURES
But for Elgin W. Forsyth, hurricanes and spongers might have completely destroyed them

nition from a grateful world.

The Andros negroes, cruising for two or three months at a time in their sponging schooners off the western coast, longed mightily for fresh meat to supplement their diet of flour, rice, fish and tinned beef. "Fillymingoes, dey good white meat", and the beautiful pink birds, standing three or four feet high, could be seen from half-a-mile away. Whenever the spongers landed and discovered a flamingo rookery, they used to run across the flock with a tautly stretched rope. The rope broke the fragile, stilt-like legs and slender necks of all the young flamingoes who could not fly. As the birds lay but one egg a year, it is easily perceived that the whole increase of the rookery would be slaughtered at one time.

In Florida, the flame-bird had been exterminated; in Cuba, whole flocks of young had been driven to market like geese. They fled to the Bahamas for refuge, and there they were marked for the same doom.

In 1922 a warning by Dr. L. C. Sanford of the American Museum of Natural History roused bird-lovers of the United States and Great Britain. The Bahaman Government then declared Andros a sanctuary, and appointed Commissioner Forsyth the warden of Andros.

He faced an appalling task that summer. Nobody knew where, in all the thousand square miles of unexplored swampy back country, cut by hundreds of deep and shallow inlets and mangrove-bordered channels, the rookery was located. The flamingoes had left their old haunts, as a month's discouraging search of that uncharted region proved. One of Forsyth's assistants got lost in the interminable swamps, and his body was not found for forty days.

At last the rookery was discovered, hidden deep in the flooded mangrove "swashes" of southern Andros. The entire colony then numbered only twenty-five hundred birds, although in 1900 Forsyth and his father had seen a single flock of more than ten thousand.

Two watchers were stationed in a hastily-erected palmetto-thatched hut to guard the birds from spongers. They had to be relieved frequently, because of the loneliness, fever, swarms of mosquitoes and the vicious doctor-flies, that are our horse-flies. But six hundred young were raised successfully.

Each year the search had to be repeated, because the persecuted birds had changed their age-long habits, and seldom returned to the last year's rookery. Patience and protection reaped a reward, however, and in time the colony more than doubled.

Then came the disastrous hurricane of 1926. Forsyth was appointed special hurricane commissioner for all of Andros, with the tremendous task of providing for the injured, homeless, and starving natives, many of whom were widowed and orphaned by the destruction of the sponge fleet.

THE FRIEND OF BIRDS
According to his wife, this is the only photograph ever taken of the Andros commissioner. His two woodchoppers are at his left

When human suffering was at last alleviated, and he could attend to his flamingoes, he found thousands killed. Undaunted, he started his task anew with fewer birds than in 1922. Last year several hundred young were saved, and watchers were posted for the present season. The birds' chief enemies are still the spongers. They have no sympathy with protection, asking bitterly

IN THE ROOKERY
Watchers rounding up the birds. Careful attention saves several hundred young each year

"Why do de guberment take de fillymingoes fum us and send um to de rich"? They refer to the few birds which are caught by the watchers and sent to museums throughout the world.

In recognition of his work, Commissioner-Warden Forsyth has been made one of the few honorary life members of the American Museum of Natural History. Letters, inquiries and visits of bird-lovers from all over the world have fairly swamped the busy protector of the flamingoes.

In 1924 he rendered great assistance to the American Museum, when Roy W. Miner and an expedition took up bodily a forty-foot section of the living barrier reef of Andros. Artists went down to the ocean's floor in the glass-windowed Williamson Submarine Tube to make water-color sketches of the reef's normal coloring and "vegetation". Williamson, the undersea motion picture pioneer, went down in a diving suit to secure the clusters and trees of living coral, sea ferns, gorgonians, and other animal life that builds up the reef. In all, forty tons of coral was raised, packed, and shipped to the museum, where the work of assembling and reproducing it is still going on.

Besides Forsyth's other work, he has taken charge of protecting the native white-crowned blue pigeon of Andros, which seemed to be going the way of the flamingo, the passenger pigeon and the auk.

"Why is it", he asks, "that a man who steals a human work of art is forthwith haled to the prison, yet he may with impunity obliterate forever the greatest masterpieces of Nature"?

And neither this practical conservationist who has worked under almost insuperable difficulties nor fellow-protectionists in the North, can find a logical answer.

The HANDLE OAK TREE

by H. M. Holland

It Might Be A Needle's Eye

THIS might be called the "handle tree". Perhaps it is the eye of the needle through which it is easier for a rich man, with or without pomposity of waistline, to get than to crash the heavenly portals. The tree is a black oak, *Quercus velutina,* and grows near the city of Galesburg, Illinois.

Hunting for freaks such as this is a new sport for the camera man, and not prosaic. Nature has had to have her little joke at her own expense every once in a while, and the camera is quick to catch the point. This tree has rightly become famous.

The Psychology *of a* Garden

The Flowers Know How to Use It On Their Lovers

by Robert Clark

THERE'S a psychology of a garden. I have found it amid the flowers on those long afternoons after I had packed my students homewards; or during those summer days when James and Lange and Freud were safely gathering dust on the shelves, and a psychology professor was forgetting all about the workings of the mind. It's a psychology that doesn't have to be taught—the flowers know it already; they use it daily to twine their tendrils around the hearts of those who look upon them. There are instincts, and senses, and memory. There is reason, judgment, attention and interest. There is a subtle, unanalysable cunning that makes them nod acquiescingly, no matter how foolish are the things I say.

Instincts are original birthday presents from our "family"; they are common to us all—a common ground from which all our thoughts, our feelings, our behavior grow. And what a field for instincts is this garden of mine! The entire gamut of these inborn t e n d e n c i e s is played upon in the life of the gardener, from fearing and fighting up to kindliness and sympathy. If plants have instincts, then the instinct for rivalry is noticeable through all the garden. It is closely connected with fighting,—not a doubt of it; the way in which the stronger crowd out and win over the weak is merely the result of the struggle for existence that allows the fit to survive. What an advantage those disreputable weeds have over the weak, young, worthy plants! And the gardener who would gain success might well sing the line of that old hymn: "Surely I must fight (bugs, weeds, and weather) if I would win".

JUST SHOWING OFF

Flowers, like humans, love to display themselves. The hollyhocks and delphiniums stretch upwards so as to be seen

"Curiosity is the mother of interest, and interest is the mother of attention. To secure attention, care for both the mother and the grandmother". The question mark is the beginning of knowledge. My garden is a constant teacher. Not a day but that curiosity is aroused. There may be some unwelcome "hobo" visitor in the shape of a new "bug" I have never seen before. Here is a new weed. Is it a weed? I am curious to know so I will let it grow for a few days. Every first flower of the season, every unusual coloring, every floral surprise,—and the garden is full of surprises,—cultivates a curiosity that demands attention. Indeed the very success of the garden depends upon the careful attention given to satisfy the "scientific spirit" fathered by the demand to know.

Love of display,—how the plants enjoy showing off! The hollyhocks

and tall delphiniums are so afraid they will not be seen unless they stretch upward till they tower over their neighbors. That tapestry of sweet peas is never hidden. No, indeed! The flowers must display their combination of delicacy and strength in their range of colors. There are four and even five of them on a single stem flying up and out as far as they can in order to be admired. And what a pride the gardener takes in displaying the products of his care! Weeks ahead he plans for the annual exhibition, and his heart beats wildly when he sees from behind the drawn window curtain the passer-by stopping to notice and admire.

LIKE SCHOOL BOYS ARE PANSIES

Though saucy-faced and comical, and always playing with the wind, they are generally well-behaved

Is there any possession that gives a stronger instinct of ownership than the results of careful gardening? I fear my friends can not understand why I am not more generous with buds and blooms; why I do not clip and strip them off and give them away with a lavish hand. But such friends do not own gardens of their own. And how angry I feel when the discovery is made that some intruder has taken—stolen—*my* property; it may have been the one small rose on a new rose plant I was trying out with glorious hopes. What a joy there is in being a power in plant creation! A new plant! Anyway, it is different; I developed it. It is *mine*. My garden is so much my possession that sometimes it seems to possess me, and I cannot share it with anyone.

Here is a plot that expresses both the hunting and collecting instincts; it contains a dozen or more varieties of violets, each hunted out in the wild and placed into this one family group, where by a protective and mothering instinct, several have developed into rugged plants, and all of them have become very well tamed.

The plants of the garden seldom clash. They enjoy being together. Is there a gregariousness among plants as among animals? Even scientific botany requires plant societies. They are so much better behaved when grouped with their own kind. Only specimen trees and a few shrubs are made to stand alone, as if on guard.

Consider the senses. First, sight. Note closely the psychology of the color changes, from those of the timid little snow-drops and the bolder blues and yellows of crocuses in the spring-time, to the cheerful, stronger colors of the season's childhood. The infancy of the annual garden growth is lacking in reds, but what a gorgeous flaming youth in those peonies and oriental poppies! A little later, in maturity, the clinging vines—much more sedate are those pink and yellow honeysuckles. And then dignity of age in the sociable phlox and other stately companions, as the garden's life draws near its season's close and individuality more openly asserts itself. Senescence is said to bring out true, unrestricted personality. It is a joy to watch the ever-changing pageant passing on from the beginning to the close of the floral year.

There is no noise in my garden. Ah! I love it, for therein are living companions that never talk back. To them I can in absolute confidence tell all my secrets, all my disappointments, all my fondest hopes, and they will never tell. They give their response in other ways than in strident voices; they nod their heads to me in such friendly ways, they caress my hand with such a tender touch, they breathe out such a stimulating fragrance, that I am cheered and gain renewed strength.

THE PSYCHOLOGY OF COLOR

The gentler shades of infancy become riotous with flaming youth, but age brings quiet, peaceful tones

The delicate flavor of these berries, of every delicious food my garden supplies, is smell. Here is the chemical laboratory, where each chemist distills smells throughout the season: lemon verbena,

"sweet Mary", three or four rose geraniums, heliotrope, lavender, of course, and several others all giving forth the delicious products of their old-fashioned alchemy.

Home and Garden bulletins on Roses, Peonies, Bulbs, Lawns, Garden Planning and Garden Decoration are available to members on request. The new series of garden articles will begin in the January issue of Nature Magazine

Is there any surer memory tonic than the sense of smell? In my garden I live in the present opportunities, in faith in the future, but also in the joyous recollections of the past. Every sudden fragrance brings back a treasured memory. An unexpected whiff of lilies of the valley, and again I am beneath the bay window of the old brick house and a whole succession of memories of my childhood follows. A few times I have inhaled a certain rare fragrance. I hardly know from whence it came—it must have been a bouquet of delicate scents—but each time it has immediately recalled a happening of years ago. With the small boy's instinct for exploration I once discovered beneath the shelter of a guardian rock a strawberry plant with large cream-colored berries that were fully ripe and deliciously fragrant. I broke off the heavily laden stem, carried it home and gave it to my mother. Had I been a budding Burbank or scientific horticulturist that plant would have been saved; it might have produced thousands of dollars for me and the world in time might have enjoyed another and a different fruit. It was the most valuable token of filial love I ever gave to my mother.

The scent of jessamine reaches me as I pass by and I at once recall a certain evening in December. A wearisome long trip from San Francisco to Santa Barbara, then a large hotel, so old-fashioned that the furniture in my room was heavy solid black walnut and brought a touch of nostalgia for home and friends thousands of miles away this evening of Christmas day.

The memories of old age. . . . "I wish you could have seen your great grandmother's garden". It is grandfather who is speaking. . . . "These tomatoes are surely big ones and they have a nice flavor, but I remember those in my mother's garden; she called them love apples. We never ate them. She raised them because she thought they were pretty. I remember in one corner of that garden—I remember—I remember. . . ." Dear grandfather's garden of his heart is a garden of enduring and delightful memories.

Faith, doubt, disappointment, hope, grow in my garden. Would it be possible for a gardener to come from his garden after feasting his soul upon living delicate color and exquisite fragrance without a heart filled with love and sympathy and the feeling that God's in my garden, and all's right with my world?

A teacher visited my garden a few days ago. Teachers translate all that interests them into terms of their own profession.

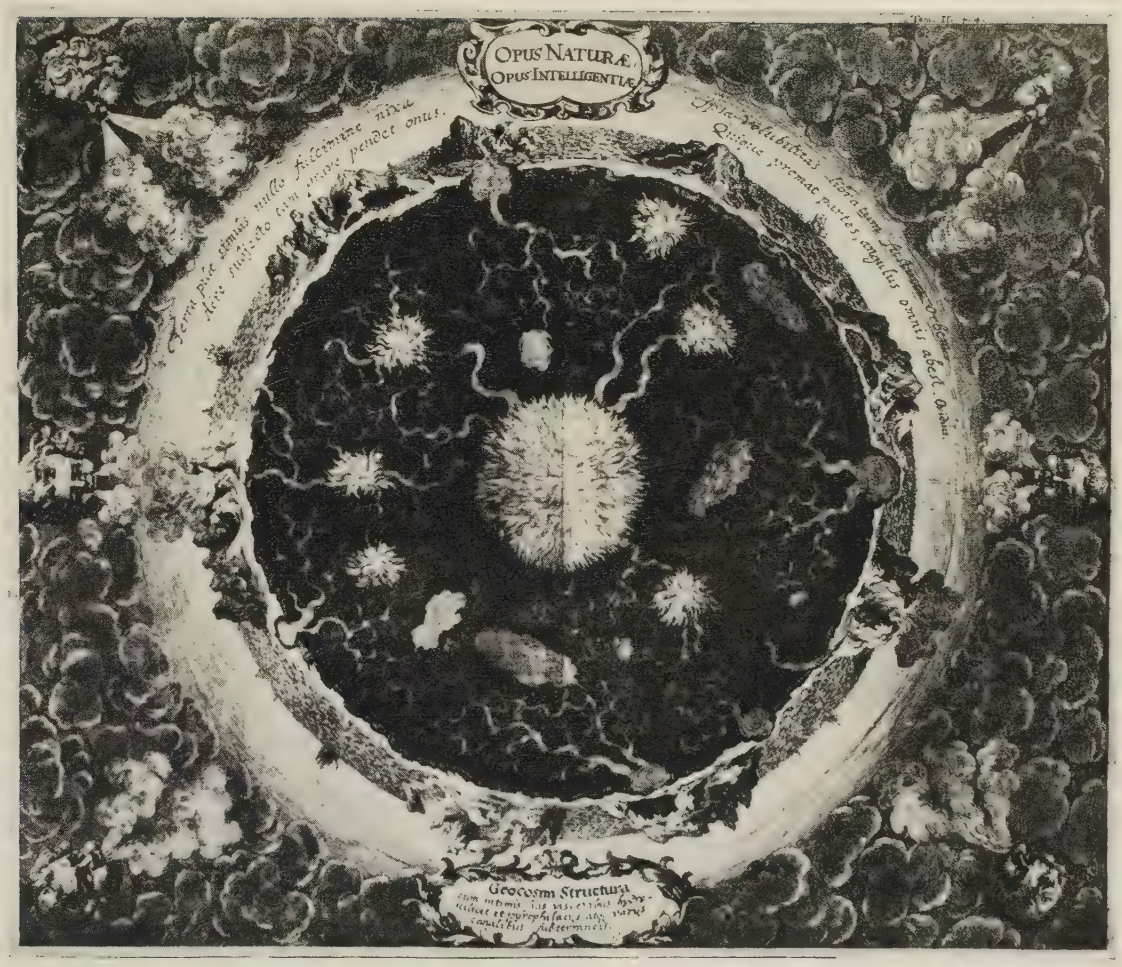
"How like the school is a garden", she said. "Black-eyed Susans, bouncing Bets, sweet Williams. Here are those comical-faced pansies—so well behaved, a big busy group; and here are those verbenas, sprawling all over. Some pupils are like tulips, they stay just where they are put, do just what they are told, arrive on time, and seldom do anything original. Others, like these gaillardias, in spite of their environment, tend to revert back to the ordinary, but once in a while, here and there, do something brilliantly unexpected.

"One of the greatest joys comes from taking some human 'weed' from poor soil, trasplanting it into *my* garden, and then watching it develop into a beautiful, strong, attractive plant. I recall"—(I noticed she had her eye fixed on a rather scraggly ashamed-looking plant I had permitted, in hopes, to remain in my garden)—"I recall one poor little wild bush so full of thorns I could not touch it without being repulsed and made to suffer. It was not the kind of a plant to respond to any sympathetic attention, but a sensitive plant that closed up at the least touch of kindliness. Its very repulsiveness, however, urged me to change its unattractive disposition. Its appearance indicated that its strongest instinct was that of fighting. But little by little, as loving interest was given, this plant developed—a few more leaves timidly reached out towards the sunshine,—although still it was unlovely. For several days it was neglected. And then, one morning, I noticed a little bud. That plant received especial care, till there blossomed forth the most wonderful flower I have ever seen—an unusual beauty of expression that was worth all the time and devotion that had been given in its care. After all, do not all plants, those of the garden—and human plants too—have to be, as grandmother used to declare, 'loved if they're goin' to grow up'?"

I acquiesced, knowingly, sagely. For you see, having discovered the psychology of a garden, I understood exactly how they responded to kindness and beauty, just as their beauty and friendliness enabled them in their own turn to hold humans firmly in their grasp. Go into your own garden and find for yourself.

The flower has an inner meaning, hopes and fears that inspire its brief existence, a scheme of salvation for its species in the struggle for survival that it has been slowly perfecting through the ages with some insect's help. It is not a passing thing to be admired by the human eyes, nor does it waste its sweetness on the desert air. It is a sentient thing, impelled to act intelligently through the same strong desires that animate us, and endowed with certain powers differing only in degree, but not in kind, from those of the animal creation.

CHARLES DARWIN



AS ATHANASIUS KIRCHER, OF THE SEVENTEENTH CENTURY, PICTURED THE INSIDE OF THE GLOBE

WHAT'S INSIDE *the* GLOBE?

Old and New Answers to an Ancient Riddle

by Charles Fitzhugh Talman

IT is a remarkable fact that man devised means of exploring almost infinite depths of celestial space long before he learned how to plumb even a few miles of the solid globe beneath his feet. In the days of our grandfathers many of the most wonderful discoveries of astronomy were already old stories, so old as to have lost their glamour. The surface of the moon had been mapped in detail; the sun and the planets had been weighed; some of the brighter stars, unthinkably distant from our solar system, had been subjected to chemical analysis by means of the spectroscope. The boundless universe had been laid open to human inspection—yet the interior of the earth was a sealed book.

Not only was it sealed, but it seemed likely to remain so forever. The heavens could be seen, even without the aid of telescopes, but the subterranean world was invisible and

"SYMMES' HOLE" AND THE HOLLOW GLOBE

As depicted by an imaginative American of the nineteenth century

apparently inaccessible. Travelling into the depths of the globe in order to unveil its secrets was an exploit for story-books, and Jules Verne published one on this theme in 1872 which did violence to the most elementary principles of physics and physiology. Scientific men perceived that such an enterprise was wildly impossible, yet neither they nor Jules Verne—whose talent for anticipating scientific discoveries has been absurdly overrated—foresaw that subterranean explorations would eventually be conducted, just as astronomical explorations are conducted, from posts of observation situated on the earth's surface. That is what has since happened. No member of the human race has ever descended more than a mile or so below ground, yet science is now busily exploring the innermost depths of the earth.

Before we explain how this paradox has been brought about, let us take a look backward to the times when speculation concerning the earth's interior served as a substitute for actual knowledge. Some of the notions that once prevailed on this subject among men of light and learning were fantastic in the extreme. Athanasius Kircher, the inventor of the magic lantern, whose book *Mundus Subterraneus* exercised great influence in the seventeenth century, believed the globe to contain enormous caverns filled with fire, communicating with active volcanoes, and other huge caverns, supplied with water from the ocean, connecting with hot springs at the surface. A little later Dr. Thomas Burnet, in England, advanced the view that the surface material of the earth rests on a layer of oil; below this was a layer of water, and at the center a mass of solid sediment.

One chimerical idea that has cropped up from time to time in the past,—and continues to do so in American newspaper journalism,— is that the earth is a hollow shell. This notion was seriously entertained by more than one bygone philosopher and was much embellished by popular writers. Humboldt writes in his *Cosmos* concerning some of these flights of imagination.

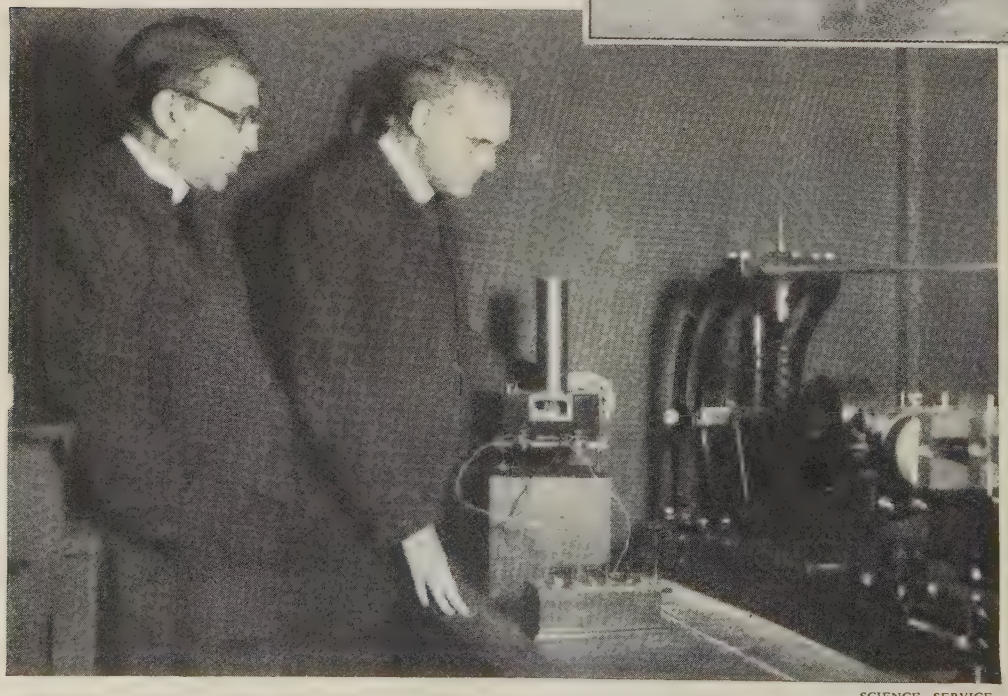
"The hollow sphere has by degrees been peopled with plants and animals, and two small subterranean revolving planets—Pluto and Proserpine—were imaginatively supposed to shed over it their mild light. As, however, it was further imagined that an ever uniform temperature reigned in these internal regions, the air, which was made self-luminous by compression, might well render the planets of this lower world unnecessary. Near the north pole, at 82 degrees latitude, whence the polar light emanates, was an enormous opening, through which a descent might be made into the hollow sphere".

The belief in this polar opening was championed by one John C. Symmes, an ex-captain of the United States Army, as a part of his harebrained "theory of concentric spheres", which attracted much attention, both in this country and abroad, from the year 1818 onward. Symmes wrote and lectured extensively on his hobby and tried in vain to induce the Government to back an expedition which was to enter the interior of the globe by what came to be popularly known as "Symmes' Hole".

During the first half of the nineteenth century, though there were still many conflicting views about the con-

AN EARTHQUAKE RECORD

C and B register longitudinal and transverse waves, from interior, while A shows violent surface shocks



SCIENCE SERVICE

THE NEWEST SEISMOGRAPH

An eye that peers into the interior of the earth and discovers facts

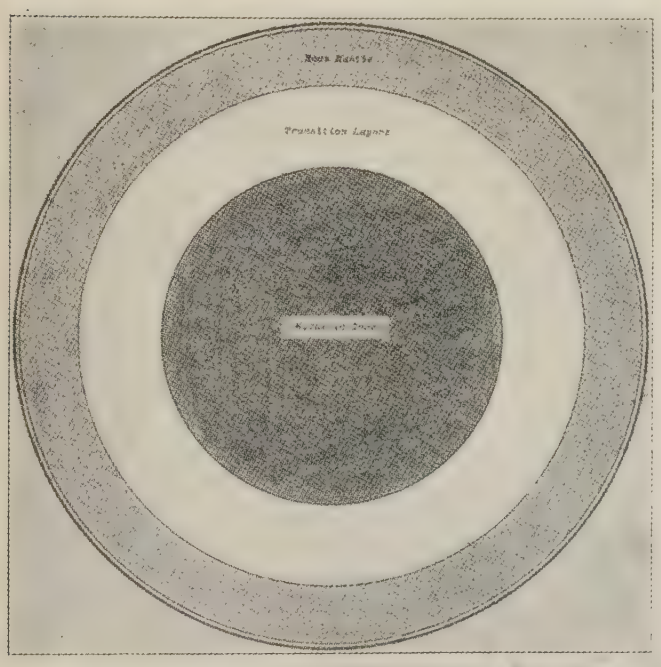
stitution of the earth, the rank and file of geologists settled down to the idea of a "molten interior". The belief prevailed that the earth consists mainly of matter in a fluid state, on account of its high temperature, surrounded by a solid crust not more than twenty or thirty miles thick. This view was espoused by Humboldt, the most influential scientific writer of his day, and it acquired so firm a hold upon the mind of the public that it still flourishes vigorously outside of scientific circles.

There were a number of plausible arguments in behalf of this hypothesis. It appeared to explain the phenomena of volcanoes and hot springs. It agreed with the observed fact that the temperature of the earth increases downward, as far as it can be measured, at the average rate of about one degree Fahrenheit for every sixty feet. Lastly it was in accord with the once generally accepted Nebular Hypothesis of the earth's origin, which assumed our planet to be in process of cooling down, by loss of heat at the surface, from a primordial mass of incandescent gas.

A fatal blow was dealt to this hypothesis, however, in the year 1862 by William Thomson, afterward Lord Kelvin. Confirming a conclusion reached years before by a less eminent authority (Hopkins), he proved that the earth must be, on an average, more rigid than steel to resist, as it does, the enormous tidal pull of the moon and sun, tending to deform its surface. If it consisted mainly of soft or molten material, surrounded by a thin hard crust, the latter would be warped out of shape and probably broken to pieces by tidal forces. Thomson believed that, even if the earth is not solid throughout, its crust must be at least 2,000 to 2,500 miles thick to maintain its present figure. Equally convincing proofs of the earth's great rigidity have been found in the way it spins on its axis and in the way earthquake vibrations are transmitted through it.

Lord Kelvin's dictum has become famous, but it was only one of several steps leading to our present sound knowledge of the earth's interior. A fundamental fact bearing on this subject is that the average density of the globe, which has been quite accurately determined by measurements of gravity, is much greater than the density of the rocky materials at the surface. In comparison with water, which is the standard for expressing the density of solids and liquids, an average sample of surface rock has a density of 2.7, while the density of the earth as a whole is 5.5. Hence there must be a great preponderance of dense or heavy matter toward the center.

There are two ways in which this high central density might be explained. It might, in the first place, be the result of the tremendous pressure to which matter inside the earth is subjected by the material above. At a depth of 100 miles the squeeze of the overlying rocks amounts to about 300 tons per square inch, and at the center of the earth, despite the fact that the matter there has



OUR ONION-LIKE EARTH

A diagram by Dr. James B. Macduane S. J., showing the rock mantle, transition layers and metallic core

THE WILLAMETTE METEORITE

The composition of such bodies furnishes a clue to that of the earth

no weight, the pressure upon it is computed at the astonishing figure of 22,000 tons per square inch. At one time it was thought that pressure alone might account for the increasing density toward the center. In recent years, however, compression tests of various rocks made in laboratories and evidence afforded by earthquake records indicate that the matter at the center of the earth does not owe its great density merely to squeezing, but consists of some substance that is relatively dense at ordinary pressures.

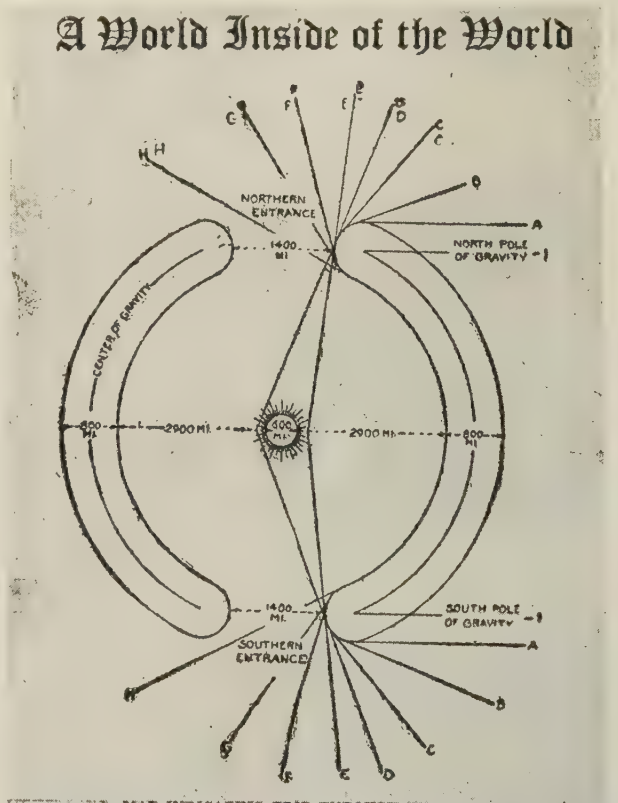
For two reasons this substance is believed to be iron or an alloy of iron and other metals. One reason is that the earth as a whole behaves like a magnet,—a circumstance upon which the use of the mariner's compass depends,—and iron is by far the most magnetic substance known. The other reason is that iron is the chief constituent of meteorites. These objects are constantly falling upon the earth from outer space, to the extent of about 40,000 tons a year. They are supposed to be fragments of planetary bodies, and their composition is probably indicative of that of the planets in general. Many consist wholly of iron, alloyed with nickel or cobalt, while others are mixtures of iron and stone. If the earth is of similar composition, and if it was ever in a liquid or semi-liquid state, the iron would have tended to sink toward the center and the lighter stony material to rise to the top. Thus we should have the variation of density with depth that appears to exist in the globe.

The corner-stone of the old-fashioned idea of a "molten interior" was the belief that the earth is almost inconceivably hot at great depths, and that matter could not remain solid at such temperatures even under great pressure. Nowadays a different view prevails. A large part of the heat observed near the surface, including that manifested in volcanic eruptions, is thought to originate at moderate depths partly through chemical action, partly through the friction due to movements of rocks, but chiefly through radioactivity. Radioactive substances are abundant in the surface rocks but probably do not extend far downward. If they were as common at low levels as they are near the surface the earth would be steadily growing hotter. As for volcanoes, their outpourings of lava can be explained without assuming that this material comes from a depth of more than a few miles.

The various facts above set forth show that the guesswork of former days about things subterranean was wide of the mark, but they do not give us anything like a clear picture of the earth's internal architecture. This has recently been obtained in a way that was not dreamed of a generation ago—through the study of earthquakes.

The shock of an earthquake sets up vibrations of three different kinds in the earth. Those of one sort travel like ripples over the surface of the ground; those of the other two kinds pass through the interior of the globe. All three are eventually registered by seismographs, or automatic earthquake-recorders, which have been installed in large numbers in all parts of the world for the purpose of receiving such records. In many cases the records are made thousands of miles away from the scene of the earthquake.

Now it happens, fortunately for our knowledge of the earth's interior, that the vibrations passing through the globe travel at very different speeds according to the density and other physical characteristics of the materials they encounter. The relations of their speed of travel to these physical properties have been worked out, partly through laboratory tests and partly through a study of the earthquake records themselves. After a big earthquake the seismologist examines the records of the event as obtained at widely separated places and notes the time the vibrations took to travel in different directions through the globe. Putting one fact with another, it is possible to determine not only the total duration of each journey, but also how the speed of travel varied at different stages and thus to get much information as to the nature of the materials through which the vibrations passed at different levels below the surface of the earth. Thus it is that the seismograph, which was designed merely for recording the tremors of the earth's crust, has become the master-key that unlocks subter-


A World Inside of the World
NORTHERN ENTRANCE
NORTH POLE OF GRAVITY
CENTER OF GRAVITY
1400 MI.
800 MI.
2900 MI.
400 MI.
SOUTH POLE OF GravITY
SOUTHERN ENTRANCE
MAP INDICATING TRIP THROUGH THE EARTH.
SCIENTIST SAYS THERE IS A GREAT COUNTRY AND A GREAT RACE IN CENTER OF GLOBE.
CAN it be possible that down in the middle of this earth there is another earth? That a few hundred miles or so away, separated from us by ground and rock and vapor and such things, there is a great country inhabited by a great race?
Scientists innumerable have discovered life, vegetable and animal, upon other planets. Long ago the seers and mi-
downward curvature of its edge is not perceptible to them, and its diameter is so great that its other side is not visible to them. And to the error that they might 'fall over the edge' I answer, as the scientists answered the people who wondered why they did not 'fall off the earth' when they first heard it was a sphere: The force of gravity holds us in both cases.

POOR SCIENCE BUT GOOD SPACE

Or, how some free-lance writer earned his breakfast. This is an extra-bad example of journalist sensationalism

ranean secrets; a sort of sounding-machine for exploring the inmost regions of the globe.

Science, as I have already remarked, is now busy with this new task of exploration. The picture of the earth's interior is by no means complete, and some features of it are still a subject of much controversy. One point about which there is general agreement is that the earth is built up of concentric spherical layers, somewhat after the fashion of an onion. These layers differ greatly from one another in composition and properties. Starting at the outside, there is a thin crust of relatively light rock, mainly granite. Then comes a layer of heavier rock, very hard and elastic, but somewhat viscous, so that it yields slowly under the enormous pressure of the overlying crust wherever this pressure is unevenly applied. This is the so-called "zone of flowage", fifty or sixty miles below the surface.

Rocky material, or mixed rock and metal, extends downward to a depth of about one thousand eight hundred miles. The material is not uniformly distributed through this zone, but appears to be rather sharply divided into three or more layers of different densities. Lastly we come to the most interesting thing inside the globe—the central "core". This is a huge spherical mass, much denser than the rest of the earth. For reasons already explained, it is thought to consist of iron. Possibly it is fluid rather than solid. This is a point concerning which the seismograph records have not yet given us positive information. Thus is our tiny globe whirling in emptiness. It has taken centuries to plumb its depths. But centuries of science have dispelled many of the crude theories of old, and it is not yet through.

A BOYS' DELIGHT

The Fruits of the Papaw Attract Youth

by William Alphonso Murrill

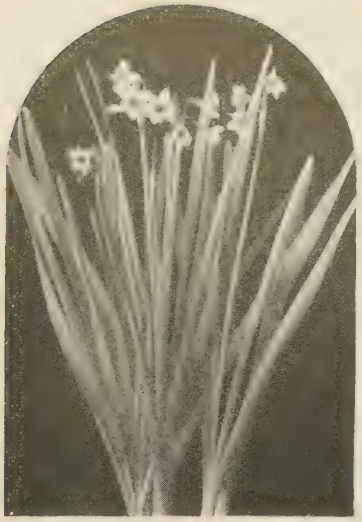
THE edible fruits of the papaw always attracted me as a boy,—or anything else wild that could possibly be eaten. I would walk for miles to the bank of a stream where the little trees grew to get ahead of the other boys in the neighborhood, and I often carried the green fruits home and let them ripen in a safe place. Of late years, I have seen several other smaller kinds of papaw growing in Florida, some of them with very showy flowers, but none have appealed to me like the northern tree.

In southern Florida and tropical America, I have often eaten the large melon-like fruits of the papaya tree, which is widely cultivated for use in a variety of ways; but this is an entirely different plant from our papaw and the two trees will not even grow in the same region. By calling one *papaw* and the other *papaya*, they may be kept distinct in our minds without a great deal of trouble.

The papaw is a shapely small tree or shrub found wild along streams from New York southward to the Gulf. Its leaves droop at a peculiar angle, and the large green-to-purple flowers appear in the spring, followed by oblong green pendulous fruits. These are fleshy berries nearly two inches thick which contain many shiny brown flat seeds throughout the soft pulp. With the coming of autumn weather, these fruits turn yellow or dark brown. There may be several of them in a cluster which suggests a bunch of very short bananas. The thin, smooth dark brown bark is often dotted with light blotches. A large specimen of this tree grows in the New York Botanical Garden, but few of its fruits are ever allowed to reach maturity. Boys are the same the world over!

THE FRUIT BOYS SEEK

They look somewhat like short bananas in the fall. Above is a papaw in full leaf



The Chinese lily, as many other plants, makes a suitable Yuletide present

HINTS *and* HELPS *for* *Home and Garden*

DECEMBER

by Harry R. O'Brien

Paper white narcissi, if forced, can be made to bloom near Christmas

OUTDOOR gardening is over for the year except for that last chore,—putting the border, rock garden and the roses to bed for the winter. This should be done now, as soon as the ground freezes hard.

* * *

In covering the perennials, if some brush or corn fodder can be laid over the garden first, it will help retain the snow. If straw is not available for covering, excelsior will do just as well. Do not cover over the tops of plants like foxgloves and sweet williams, whose tops do not die down during the winter, but merely cover around them.

* * *

Live evergreens may be used for Christmas trees indoors and then planted outside afterward, since they are dug with the roots balled and burlapped. It is a good plan to dig the hole where the evergreen is to be planted before the ground freezes or else cover the spot heavily with leaves or straw so that the hole can be dug later.

* * *

If you have an evergreen of suitable size on the lawn, run an electric wire out to it and decorate it with bulbs and trimmings so that you will have a Christmas tree outdoors. Some towns have contests in this and award prizes to the best decorated lawn at Christmas time. This was quite a success in Lexington, Kentucky, last year.

* * *

Don't forget that you can have indoor bloom by forcing bulbs in winter. By proper selection of various sorts of bulbs, you can have a succession of bloom from now to spring. Paper white narcissi, if planted the first of December in pebbles and water and kept in the cool and dark until a good root system has developed, then brought to light and heat, will be in bloom by Christmas.

* * *

What to buy friends and family for Christmas is the perennial problem that is on our minds these days. Instead of buying something useless or of fleeting value for either children or grownups, make your gifts this year something of practical and lasting value. There is no better way to express the Christmas spirit than through a gift of something having to do with the garden or with flowers and shrubs.

* * *

I know of one woman who gives live Christmas trees. One can order, to be shipped in proper season, gladioli, dahlias, lilies, perennials, shrubbery. Tools, a Japanese rake, a garden scrapbook, a garden notebook, garden furniture—these are all suitable to one who can appreciate them.

* * *

Another good gift is a subscription to one or more of the garden and outdoor and indoor magazines. Here is a list from which to choose:

Nature Magazine, Washington, D. C.; $3.00.
American Home, Garden City, L. I., New York.
Better Homes and Gardens, Des Moines, Iowa; 2 yrs. for $1.00.
Country Life, Garden City, L. I., New York; $5.00.
Horticulture, Boston, Mass.; $1.00.
House and Garden, Greenwich, Conn.; $3.50.
House Beautiful, Boston, Mass.; $3.00.

* * *

Nor is there anything more appreciated by a garden lover than a good garden book. In making the selection, keep in mind the character and status of the gardener. If he or she is a beginner, do not give one of the more advanced books or choose one with beautiful illustrations only but give rather a helpful manual of definite information. Save the other kind for the experienced gardener.

* * *

For the beginner or the gardener not far advanced, any one of the following books will make suitable gifts:

Alfred C. Hottes, *A Little Book of Annuals.* $1.50.

Alfred C. Hottes, *A Little Book of Perennials.* $1.50.

Jane Leslie Kift, *A Woman's Flower Garden.* $1.00.

Gertrude Jekyll, *Annuals and Biennials.* $3.00.

Alice T. A. Quackenbush, *All in a Garden Fair.* $2.00.
Mrs. Francis King, *The Beginners' Garden.* $2.00.
Louise Bush-Brown, *Flowers For Every Garden.* $1.75.
Elsa Rehmann, *Garden Making.* $3.50.
Emil C. Voltz, *Home Flower Growing.* $3.50.
Gertrude Jekyll, *Home and Garden.* $3.50.
Helena R. Eby, *A Woman's Hardy Garden.* $2.00.
Louise Shelton, *The Seasons in a Flower Garden.* $2.00.
Louise Shelton, *Continuous Bloom in America.* $3.50.

* * *

For each of your friends who are interested in some particular garden idea or special flower, suitable books can be found. Note that while most of those in the list mentioned above are written by women, most of these below are by men. The men in the above list are both college professors of floriculture. The specialty list would include these:

W. H. Waite, *A Little Book of Dahlia Culture.* $1.50.
T. A. Weston, *Bulbs That Bloom in the Spring.* $2.00.
Peter Bisset, *The Book of Water Gardening.* $5.00.
A. J. Macself, *Alpine Plants.* $2.00.
Ella Porter McKinney, *Iris in the Little Garden.* $1.75.
Mrs. Edward Harding, *Peonies in the Little Garden.* $1.75.
Robert Pyle, *How to Grow Roses.* $2.00.
J. Horace McFarland, *Roses and How to Grow Them.* $2.00.
George C. Thomas Jr., *Roses for All American Climates.* $3.00.
G. A. Stevens, *Roses in the Little Garden.* $1.75.

* * *

For the more experienced gardener and flower lover or for a more substantial gift, selections can be made from the following:

Walter P. Wright, *Alpine Flowers and Rock Gardens;* $6.00.
L. H. Bailey, *Standard Cyclopedia of Horticulture, 3 vols.;* $25.00.
Standardized Plant Names; $6.00 in cloth, $7.50 in leather.
E. H. Wilson, *Plant Hunting, 2 vols;* $15.00.
E. H. Wilson, *Aristocrats of the Garden;* $5.00.
E. H. Wilson, *More Aristocrats of the Garden;* $5.00.
Gertrude Jekyll, *Wall and Water Gardens;* $6.50.
Louise M. Wilder, *Color in My Garden;* $3.50.
Helen M. Fox, *Garden Cinderellas—How to Grow Lilies in the Garden;* $5.00.

* * *

Special mention might be made here of the new volumes appearing in the Farm and Garden Library series being issued by the Orange Judd Publishing Company, Inc. These are practical and helpful little manuals, up to the minute. Some of these suitable for gifts and all selling for $1.25 each are:

John E. Wister, *The Iris.*
A. C. Beal, *The Gladiolus.*
F. A. Schrepfer, *Book of Evergreens.*
Clark L. Thayer, *Spring Flowering Bulbs.*

* * *

If your garden ground is a sticky clay, working in of a fair amount of fine coal ashes will help break it up and make it friable. If you put your ashes in a tub or garbage can and wet them down, they will handle like sand. A mason's round hand-sieve is most convenient for sifting them.

* * *

One of the greatest blessings in the basement is water by the furnace door. Have the plumber run a pipe to the side and top of the furnace and attach a bib. To this attach a piece of hose—six to eight feet is a handy length. You will then have water ready for the evaporation pan, for wetting down ashes and for sprinkling the coal.

* * *

If you plan to build, be sure to include a fruit and root cellar in the basement. Hollow tile makes a good wall for this. Provide for an outside opening to admit cool air. Have the contractor build in shelves and bins. You will be delighted with the many uses of such a cellar.

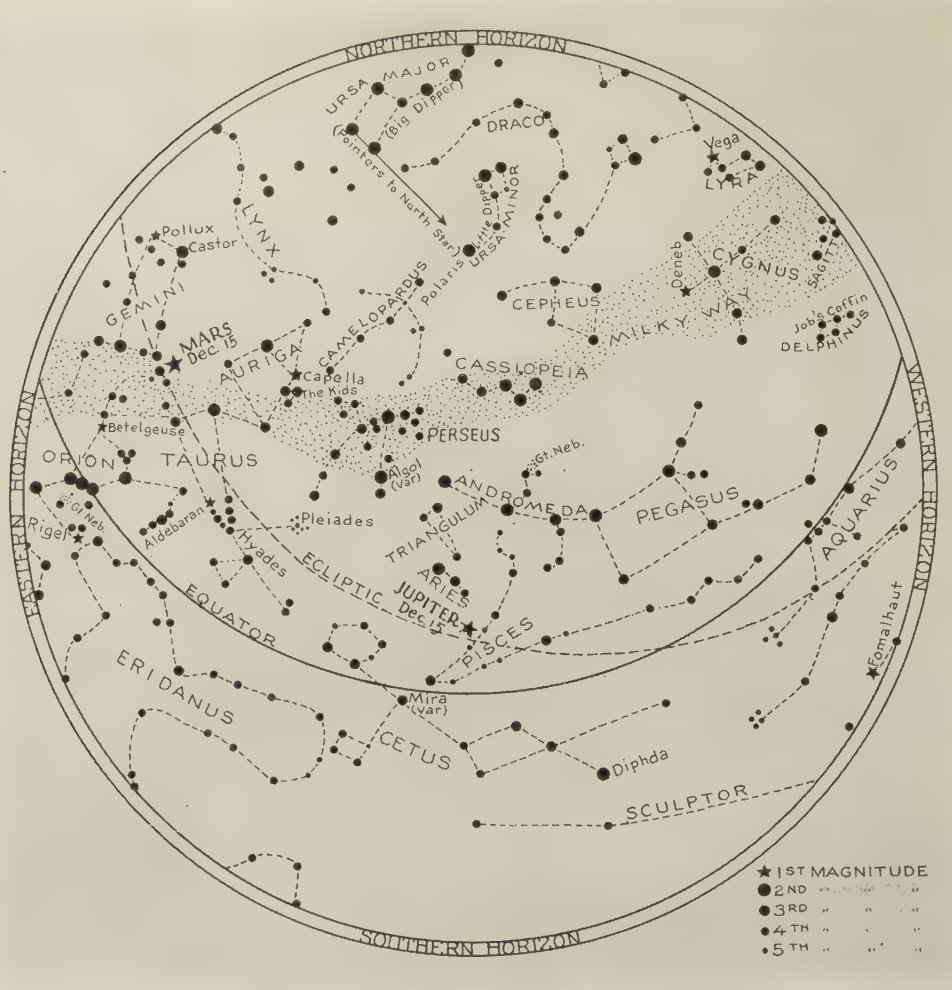
* * *

A LIVING CHRISTMAS TREE
What more beautiful than lights on the shapely evergreen on your lawn during the holidays

Horticulturally-inclined readers will find quite novel and very meaty the new series of garden articles which, as announced last month, will begin in the January issue. Clarence E. Baker opens them with the gladiolus. These articles will approach flowers from an entirely new angle; they will be the results of research and the climbing of family trees. They will take you far back into the distant past, when the ancestors of the proudest, best educated flowers of today were but untamed wildlings; then they will bring you along the tortuous paths that the flowers themselves took on their way to perfection. The writers will not be content, however, to give you merely the history of the plants and of those who developed them; they will stress modern methods of care and cultivation, and advise as to best ways of grouping for aesthetic effects. Among the flowers whose pedigrees will be traced are the anemone, aster, columbine, coreopsis, chrysanthemum, dahlia, delphinium, foxglove, gladiolus, lilac, poppy, sweet pea and zinnia. Some of the more popular of our garden writers—Dorothy Pletcher, Albert A. Hansen, D. Hart, and Mr. Baker—will undertake this project.

* * *

If productive personal experience is permissible, I have a tip for those who track ashes and frozen garden dirt through their homes and suffer by word of mouth. I escaped an irate housewife by arranging an area-way opening outside a deep-set window in the basement. A little stairway in this allowed my muddy feet to find unhallowed ground on which to tread in peace and safety.



TO USE, HOLD OVER HEAD WITH TOP TOWARD THE NORTH

This map is designed for use on Dec. 1, 9 p. m.; Dec. 15, 8 p. m.; and Dec. 30, 7 p. m.

The Twenty Brightest Stars

Interesting Facts About Well Known Stellar Neighbors

By Isabel M. Lewis

Of the six or seven thousand stars that lie within sight of the unaided eye in the entire heavens there are only twenty that are of the first magnitude, or brighter, and all of these stars are comparatively near to the earth. Alpha Centauri, the nearest of all the bright stars, is 4.3 light years distant from our sun and his family of planets. Alpha Centauri is a double star,—that is, it consists of two suns that are in mutual revolution. There is also another star in this system known as Proxima Centauri, a remote companion of the other two, that is even nearer to the earth. So far as is known, it is the nearest of all the stars.

Next to Alpha Centauri the nearest star in this list of exceptionally bright stars is Sirius, which is 8.8 light years away. Sirius, as is well known, is the brightest of all the stars. It will be recalled that it has a most remarkable companion star, one of the strangest stars in the sky, of which we wrote a few months ago. Sirius is extremely hot. Its temperature is the same as that of the brilliant Vega, which would send a thermometer up to more than eleven thousand degrees Centigrade or about twenty thousand degrees Fahrenheit. The surface temperature of our own sun is only about six thousand degrees Centigrade or approximately eleven thousand degrees Fahrenheit. Capella, Alpha Centauri and Procyon are very nearly equal to our own sun in temperature. Such stars are yellowish in color. Capella is of exactly the same type as our own sun but it is a giant with a diameter of about ten million miles while our own sun is a dwarf yellow star with a diameter of only 864,000 miles,—a mere astronomical bagatelle.

The coolest stars in this select assemblage are Arcturus, the orange-hued star, with a surface temperature of about four thousand degrees Centigrade, and Betelgeuze, Antares and Aldebaran, whose temperatures are about three thousand degrees. The last three are reddish in color and Betelgeuze is also variable in brightness, which is a characteristic of many of the variety of red stars.

Antares and Betelgeuze are super-giant stars. The latter is large enough to more than fill the orbit of the earth were it placed at the center of the solar system, and Antares, which has a diameter of about 400,000,000 miles, would more than fill the orbit of Mars. Aldebaran, although much smaller than either of these two stars, is also a giant with a diameter of about 20,000,000 miles.

Among the most remarkable of these twenty brightest stars are the tremendously hot and brilliant white or bluish white stars, Canopus, Rigel and Deneb. These three stars are of the order of six hundred light years distant from the earth. They are more than a hundred times farther away than the nearest star, Alpha Centauri. Yet Canopus is the brightest star in the heavens, next to Sirius. To shine as brilliantly as it does at a distance of approximately 650 light years it must have a tremendous light-giving power. It is estimated, in fact, that Canopus is equal to 80,000 suns such as our own. That is, it would take the combined light of 80,000 suns to equal Canopus in luminosity. Rigel, a star of similar type, about 550 light years from the earth, is estimated to have a luminosity nearly 20,000 times that of our own sun, while the shining power of Deneb, which is about equal to Regulus in apparent brightness, and which is about 650 light years distant, is fully 10,000 times that of our sun. Were these three stars as near to us as Sirius or Alpha Centauri they would far outshine the planet Venus, the most brilliant stellar object in the heavens. Sirius owes its great brightness to nearness to the solar system rather than to great light-giving power.

More than half of the twenty brightest stars are less than sixty light years distant from the earth. In order of distance they are Alpha Centauri, 4.3 light years; Sirius, 8.8; Procyon, 10.5; Altair, 16; Fomalhaut, 24; Vega, 26; Pollux, 32; Arcturus, 41; Capella, 47; Regulus, 56; and Aldebaran, 57 light years distant. Next to these in order come Achernar, 66; Betelgeuze, 190; Alpha Crucis and Spica, about 230; Beta Centauri, 296; Antares, 360; Rigel, 550; and Deneb and Canopus, 650 light years away. As a light year is the distance light travels in a year at the velocity of 186,000 miles a second it is equivalent to about six million million miles, so if we wish we can also note the space between these stars and ourselves in terms of miles.

It will be seen from the figures given above for the individual stars how greatly they differ in distance. While the light of Alpha Centauri, the nearest, takes a little more than four years to travel to the earth, that of Canopus and Deneb takes about six and a half centuries. The light from Alpha Centauri that is now reaching the earth started on its journey in the year 1924 but the light from Deneb, at the head of the Northern Cross, that reaches us tonight started on its journey nearly two hundred years before the discovery of the New World.

As we have seen, these stars differ among themselves as greatly in size, brightness and temperature as they do in distance. Ten of them,—Alpha Centauri, Sirius, Capella, Rigel, Procyon, Alpha Crucis (one of the stars in the Southern Cross), Aldebaran, Regulus and Antares,—have companion or attendant suns, some too close to the brighter stars to be separated in the most powerful telescopes. Alpha Centauri, Capella and Regulus also have a few companions at great distances.

Beta Crucis in the Southern Cross and Castor in Gemini are two stars only slightly inferior in brightness to the least brilliant of the twenty stars in our list and should at least be mentioned. Castor is an interesting triple star that is only 43 light years from the earth.

All of the twenty brightest stars with the exception of Canopus, Alpha Centauri, Achernar, Beta Centauri and Alpha Crucis are visible north of the 37th parallel of latitude. Canopus is visible south of this latitude. Achernar appears on the southern horizon at latitude 32°N, Beta Centauri at 30°N, Alpha Centauri at 29°N, and Alpha Crucis, in the Southern Cross, at 27°N.

Of course the farther south one goes beyond these limiting parallels the higher these stars will appear above the southern horizon. In the latitude of Miami, Florida, all of the twenty brightest stars are visible, in their seasons, and also all the Southern Cross stars.

This month at the time for which the star map is given we may see eight of these twenty brightest stars,—Vega, in Lyra, near the northwestern horizon; Deneb, also approaching the horizon in the west; Aldebaran, in the Hyades in Taurus; Betelgeuze and Rigel in Orion, far over in the southeast; Pollux (and also Castor, one of the brightest stars not included in this list) in Gemini; Capella in Auriga, in the east; and Fomalhaut, now on the southwestern horizon. To this number will soon be added the two dog stars, Sirius and Procyon, following on the heels of Orion, which are now below the eastern horizon.

Andromeda and Pegasus are now in fine position for observation. The three bright, second magnitude stars in Andromeda extend in a curved line from a point nearly overhead to the northeastern corner of the Great Square in Pegasus, which is marked by the star Alpha in Andromeda. Pegasus fills a large part of the western sky at this time. Next to Andromeda on the east is the beautiful constellation of Perseus. North of Andromeda and Pegasus lie Cassiopeia and Cepheus with Cygnus northwest of Pegasus and directly west of Cepheus. Deneb, at the top of the Northern Cross in Cygnus, is one of the twenty brightest stars, it will be recalled. Deneb was a favorite star name with the Arabians and there are several Denebs in the sky. The second magnitude star, Diphda, in the huge constellation of Cetus, which now fills such a large area in the southern and southwestern sky, is also known by the name of Deneb Kaitos. It stands in a solitary position in the southwest.

Three planets are visible in the evening sky this month. Venus is now a brilliant object in the southwest for about three hours after sunset. Its distance from the sun is increasing so that it is coming into a more favorable position for observation each night.

Mars is in Gemini the first three weeks in December, passing into Taurus late in the month. It is now in its most favorable position for observation, for it comes nearest to the earth on Dec. 15, when its distance will be about 54,340,000 miles. Jupiter is still in fine position for observation. At this time it will be found in Aries, nearly due south.

The sun reaches its farthest distance south of the equator on Dec. 21 at 9:04 p.m. E. S. T., which marks the beginning of winter for the Northern Hemisphere and of summer for the Southern Hemisphere.

Introducing NIKKO FIR

A New Variety of Christmas Tree Makes Its Bow

By Paul F. Hannah

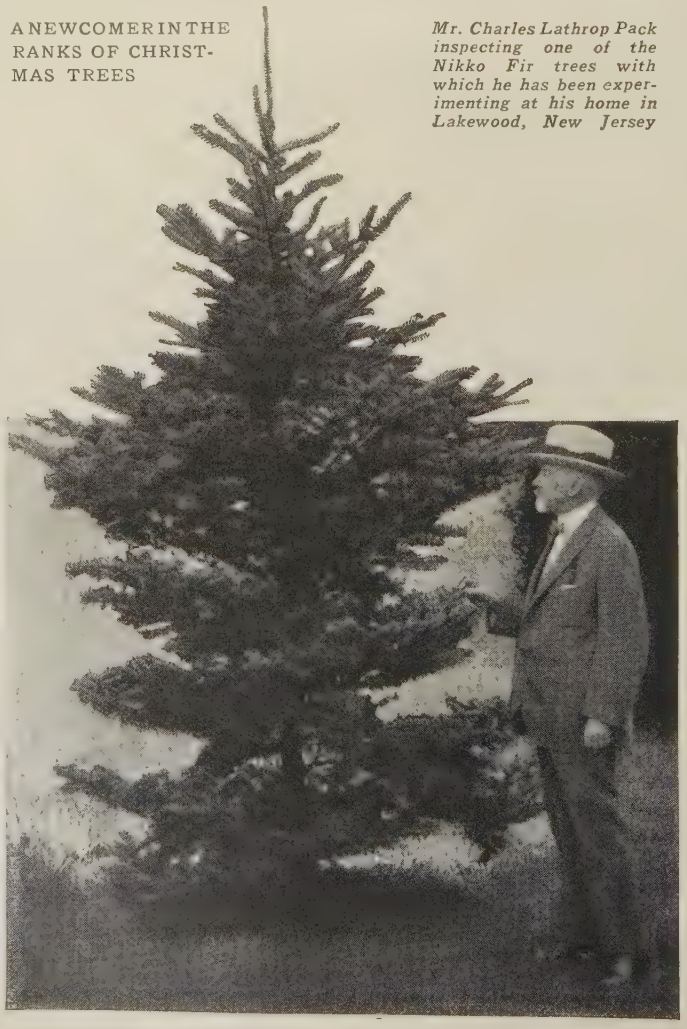
WHEN the Yule log is crackling merrily on the hearths of the twenty million American homes a few weeks from now, its blaze, in more than one third of them, will cast flickering shadows over tinsel and cornucopia and white-gleaming parcels that are half hidden by the close branches of the Christmas tree. The dancing fire-light will penetrate the needled barriers to discover toys and candy canes and such—marks of the holiday season. And what would Christmas be without the festooned and bespangled fir or spruce in the corner, and the morning scramble in pajamas to strip it of its unnatural but delicious fruit?

All of the six million trees that add to the season's festivities could be grown, if properly planted, on a mere six thousand acres of land. With more than eighty-one million acres of idle forest land that show I. W. W. tendencies scattered over the nation, there seems to be no good reason why the enjoyment of a Christmas tree should not be the right of every home. There is enough waste land around fence corners, in back of garages and along rights of way to furnish trees for all of Christendom and to introduce the custom into foreign countries. If the cutting of Christmas trees were the only menace to the forests, conservationists would find themselves hunting new positions.

The vandalism and trespassing that has arisen from the habit of slinging axe over shoulder the Sunday before the Big Time and going out to find or die has caused a shadow to fall over the Christmas tree. Isolated trees, future money makers, have been chopped up, tops taken, and slash strewn around, while the thick clumps that need and would welcome the Yuletide axe have been passed by. The slogan "Grow Your Own Christmas Tree" has become more popular, however, and Christmas tree farms dot the rural sections, while many utilize their lawn or back yard for a personal crop. And with the present possibilities of raising a private stock, none should have to go without. Waste land can be made productive, and neither the forest nor the land-owner will lose.

While the native spruces and firs are the customary bearers of gifts, a new variety, the Japanese Nikko fir, *Abies homolepis,* has entered the lists to carve a place for itself in the hearts of the people. It forms a broad, symmetrical crown of dark green lustrous foliage, with strong branches sturdy enough to support the most valuable presents and not so close-packed that none can find them. It can be grown in from six to twelve years after planting, depending on the size desired, and from one to two thousand will thrive on each acre. Its air of sturdiness and thrift lends it wholesome symbolism, particularly needed at this time of year.

A NEWCOMER IN THE RANKS OF CHRISTMAS TREES



Mr. Charles Lathrop Pack inspecting one of the Nikko Fir trees with which he has been experimenting at his home in Lakewood, New Jersey

It is a new, little known tree that has been grown here and there in small quantities for decorative planting. Charles Lathrop Pack, forester and economist, has been experimenting with it for the last twelve or fifteen years in his research arboretum in Lakewood, New Jersey. He has concluded that it will be a most successful and useful variety to spread over the millions of slacker acres that are now economic liabilities, and will find a place in the garden. It grows as rapidly as the native

(*Cont. on page* 400)

On To The Polls

National Flower Candidates Wait Only Will of People

THE BATTLE has joined. From the poppy-yellowed meadows of California, as from the shifting desert sands where the mentzelia is queen and the snow-packed valleys of Maine comes the rush of flower candidates and the murmur of great argument. Which shall be the national flower? This is the question.

Rumors float in that the columbine has already swept the state of Illinois; that the goldenrod bids fair to capture Alabama. Votes roll in from the youngest school child and oldest Nature enthusiasts—one hundred for the dogwood, fifty for the wild rose, seventy-five for some other aspirant. No two-party campaign, this. A hundred parties engage, numberless platforms circulate the nation. Anxious eyes watch all movements of the electorate.

Old campaigners have taken the field with confidence and magnificent gesture, and rather swagger in the presence of the more shy candidates. The columbine, for instance, that has long manoeuvered for national honors, is again pushing to the fore, with its faithful organization, the Columbine Society, massing voters to its banner. The blondish goldenrod is using the training gained in at least three state campaigns to continue its march toward victory. Will the timid ones, who advance their qualifications only, be able to stop these war-hardened veterans?

"On to the polls!" This is the cry of the flower electioneers. The stage is set, the candidates are ready, the credentials are certified and the parties, like horses at the barrier, are aligned, and waiting impatiently for the full vote of the people. "Get Out the Vote", they say. There can be no lagging now, else some unrepresentative and unworthy flower may snatch the national honors by an indecisive, scattered vote.

Like some Juggernaut of old advancing to crush out all but the strong, the great body of the electorate is gaining momentum. In the vanguard is the sovereign state of Ohio, where school, club and general public is voting *en masse*. There the State Conservation Committee of the Federation of Women's Clubs is driving for a full poll with a vigor and energy that has aroused the people. Under the able leadership of Mrs. George McDonald, chairman of the committee and president of the Ohio Conservation Council, and the enthusiastic guidance of Mrs. M. S. Thompson, garden and flower chairman, in whose hands are the details of this campaign, ballots and descriptive matter have been sent to all the clubs and schools in the Buckeye state and voters, young and old, marshalled to the ballot boxes. The state that gave six presidents to the nation may give it the national flower. Illinois, where the garden clubs are responding one hundred percent, and Florida and New York are pressing the mid-western state closely, however.

Every ballot counts. Get out the vote among your friends and in clubs and schools. Send them to the National Flower Editor, American Nature Association, Washington, D. C. A sample ballot will be found on page 406 of this issue.

NEW CANDIDATES

The Dogwood and the Black-eyed Susan are just two others seeking eternal fame

In this campaign, for the first time in history, the adults are in danger of being swamped by the younger generation. This is the first national election in which youth has been served, and with the enthusiasm born of premature citizenship and natural love for flowers, they are flocking to the polls in increasing numbers. With justifiable pride in their first ballot, they express their opinions freely as the equal of their elders. In school, no teacher has been found to wish to deprive them of their right to vote. The Campfire Girls, with full membership, are making the national poll an important instrument in their program to encourage the cultivation and conservation of flowers. The Girl Scout leaders carried back from their recent National conference at Estes Park, Colorado, the word to see that all troops and councils did their part to select a national flower. They feel the power of the ballot—the joy of citizenship.

In the past month, several new candidates have tossed their coronas into the ring. The four-parted white and pink dogwood, the black-eyed susan, the wild aster, morning glory, larkspur and dandelion are all seeking glory. F. G. Pauli, an American citizen vacationing in Digby, Nova Scotia, where the news of the poll has percolated, has become manager for the sunflower, "an exact symbol of the United States today—brilliant, tall, majestic, overreaching all, known by all, and with food for the hungry".

When have we, the people of the United States, had before us such an array of candidates? When has quality been so well combined with quantity? But one thing remains—the full balloting. On to the polls!

"LINDY"

A Baby Parrot That Achieved the Seeming Impossible

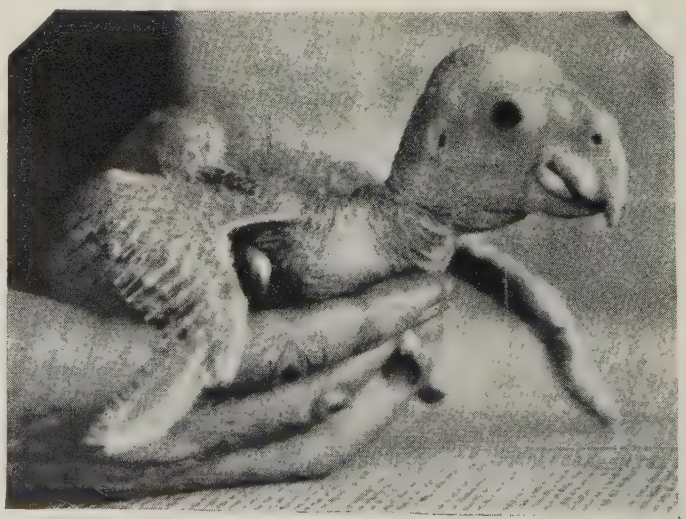
by R. P. Daniel

"LINDY'S" FOLKS
Male and female birds that succeeded in raising their offspring in captivity

"BECAUSE he has accomplished the seeming impossible, the baby parrot which was born six weeks ago in a packing case in the store of Mr. Daniel on South Presa Street, has been named 'Lindy'. According to bird fanciers in this city, never before has a parrot born in captivity been known to live".

Thus one of the San Antonio, Texas, papers chronicled the arrival of "Lindy", and more important, his survival. The story, however, starts fifteen years back when we were left a parrot for sale. This chap was a fine singer and when he died of pulmonary tuberculosis,—so the autopsy said,—he must needs have a successor. Polly Number Two never quite took the first bird's place in accomplishments but we gave him a mate and the two birds fell heir to the freedom of the store.

For four years the mother bird made nests in boxes and laid from two to four eggs. None hatched, and we did not expect them to, because parrots are not supposed to breed in captivity. Then they fooled us and one July morning I found the male bird feeding his mate by regurgitation, and beneath her was a tiny wiggling ball of flesh, so small it did not seem that it could live. Then, too, its parents had spent practically all of their lives in captivity,—what knowledge had they of raising young? But live the little fellow did, through the four weeks period of incubation, through the succeeding five weeks when its eyes were closed, and when it was two and one-half months old the little fellow was fully feathered and flying about. The father bird fed the mother and she passed the food on to the youngster in pre-digested form.



AT SIX WEEKS OF AGE
Featherless and unattractive, the baby parrot was tenacious of life in the face of prophecies that he could not live

Lindy's arrival and success at the business of living attracted many visitors, of course. This was a trial for his mother, who took to flying madly at intruders. Sometimes father joined the defensive, and occasionally the young fellow had to be shown when both parents were behind closed doors. Lindy "takes after" his mother in appearance and in dislike for being petted. His call is unlike that of either parent, but he shows a desire to talk. Mother and son will sit together, Lindy rubbing his face against hers, both indulging in sweet parrot words. She preens his feathers with pride and keeps him fresh and neat. At night he sleeps on the perch between his mother and father.

Many years I lived in Mexico, and many parrots I have seen in their native wilds. In fact, I am by way of being a "parrot booster" because I feel that they are more intelligent than we suppose them to be. Some are born talkers, some acquire speech and others, however intelligent, just do not have the "gift o' gab". They are human in this, at least.

With pet parrots I have found that the idea they do not need water, but will get it from their food, does not work. My birds have water and food within reach constantly, and if I overlook it they ask for both plainly. Bread dipped in coffee is breakfast, with shelled corn handy. They like fruits, nuts, vegetables,—cooked or raw,—and one of their feeding stunts is to take ice cream from a spoon. A chicken bone is a rare treat, although meat is not included in their diet, nor should sweets be given to any extent. Since parrots are mainly seed-eaters, it should not be forgotten that they need grit of some kind to aid their digestion, and keep them fit.

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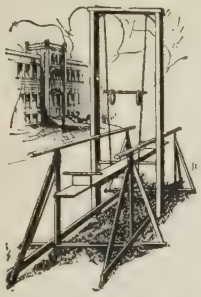
for CHRISTMAS



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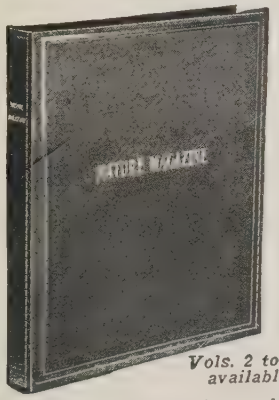

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AMERICAN NATURE ASSOCIATION
WASHINGTON, D. C.

Our Debt to the Fur Bearer

(Continued from page 361)

caught shortly after his inspection perhaps a week or two may elapse before the trapper finds them. If they miss death from predatory animals, escape by twisting off a foot, or avoid death brought on by cold, starvation and thirst, the trapper will end their lives with his stick or revolver. Days and nights of feverish pulling and hauling on the leg gripped in a steel vise may have so injured the fur that an animal having a prime coat to begin with gives to the trapper an inferior skin.

In the light of present day understanding, such a plan does not meet with the approval or the support of lovers of wild life. Is there any wonder that The American Humane Association has been attempting to work out a legislative program which will help throw around the fur animals protection which will make such cases impossible?

We do not charge that all fur-bearing animals are taken in this manner. Some are caught by water sets that quickly drown them. Fortunately, many animals could thus be taken if the trappers were willing to take the trouble to prepare such sets. Some use the snare and spring pole which throws the animal into the air with sufficient violence to break its neck. The poorest of these devices surely shortens the time of agony as compared with that caused by steel traps. Many of the old trappers know how to place deadfalls in the paths of the animals which they desire to capture. These usually bring a quick death. Traps which take the animal alive have been perfected for the beaver and the muskrat and might easily be worked out for some of the other animals.

Until recently, inventive genius in this country has not even met the request for traps which would kill humanely or take the animal alive and unhurt, but lately prizes have been offered to encourage the invention of suitable humane traps. Better traps are constantly coming to light, many of them based on new and novel ideas. It may be necessary to develop a variety of traps which will take different types of animals. There can be no question but what improvement can be had. When such traps do make their appearance, legislatures are going to bar forever the use of the leg-grabbing steel traps, even though the new ones may be more bulky or expensive.

The wearers of fur are beginning to question whether their garments are worth the price they cost. The voice of the ultimate consumer may become insistent and effective as in the campaign to save the egret. The slogan "humane furs or none" can and will open up new methods of carrying on an age-old business. No one wants to interfere with legitimate industry; but can it be defined as such, if those behind it do not use their powerful influence to purge it of its mistakes? Fur farms, intelligently managed, may be part of the answer, for on them animals may be humanely reared and killed.

Before this entirely attainable ideal is realized, intelligent conservationists, sportsmen and humanitarians will study existing state statutes and work to inject first one and then another remedy that may slowly but surely guarantee to the fur-bearer its forlorn right to a humane death.

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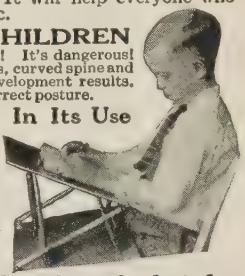

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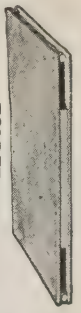

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THE NATURE ALMANAC

With the beginning of school work this fall, there is every probability that in many localities committees will begin work on new outlines for Nature work or on the revision of already established outlines. There will be others who will be interested in interpreting already existing outlines which make ambiguous requirements. To these, and to those who are interested in knowing the status of Nature Education in the United States and its possessions, *The Nature Almanac* should be known.

The files of the Department of Nature Education of the American Nature Association are generously filled with letters commending this book which, a professor in New York University says, is "epoch making". A professor of education in Teachers College, Columbia University, says that the book "filled a need which we had and for which we could find no material at all". This professor, by the way, is not a teacher of Nature Study, but is in charge of more general courses in education. It would be possible to quote effectively from letters of school superintendents, teachers and supervisors of Nature study, state education officials and members of faculties of schools of education, teachers colleges, normal schools and universities. Instead, we will merely give a review of the book for the benefit of those who do not know it.

The Nature Almanac begins with an introduction concerned with the "Why" of Nature Education. In this, are given the outstanding reasons why Nature Education is essential to good citizenship. The succinct manner in which these reasons have been presented by Mr. Pack has been cited as a model by more than one correspondent.

A Nature Calendar gives suggestions of things which may be seen in any part of the country during any part of the year. Practically all of the things cited were seen by the author in the particular month mentioned in the part of the country described. This Calendar has appealed particularly to West Coast workers because of the fact that the suggestions are as appropriate there as they are in the East. The suggestions are not limited to any particular field of science but appeal to those who are interested in plants and insects as well as to those who are interested in birds and mammals.

A section is provided which deals with associations and clubs interested in the promotion of Nature Education. This includes a directory of the officers and the aims of thirty-three state and private organizations which have identified themselves prominently with the Nature movement. These include organizations interested essentially in adult education and also those interested in work with juveniles. Representative clubs identified with each of the major fields of Nature such as birds, wild flowers and reptiles are considered for the benefit of those who have special interests in these fields. This section is followed by a chapter on how to form a Nature Club. This chapter was written in response to repeated requests from readers of Nature Magazine for this sort of help.

Leadership training, its problems and state of development, is dealt with in a separate section. This covers the work done in teacher training institutions and in the various out-door schools which have sprung up simultaneously from coast to coast.

Nearly a fourth of the book is devoted to a Nature Education Survey of the United States, which in itself was an ambitious undertaking. The views of the state departments of education, training institutions and school superintendents of every state in the Union are given. A general statement of the situation in each state is followed by detailed information concerning individual communities. In addition, attention is called to the various types of procedures which have evolved in various parts of the country so that those concerned with the preparation of material may know something of what has been done elsewhere. The authors were happily surprised that there were so few corrections submitted following the publication of this survey.

A School Nature Outline is presented which was developed from a study of the outlines in use throughout the country. This provides suggestions for grade material for each of the first six grades and is accompanied by an index of pertinent articles which have appeared in Nature Magazine. One college professor of education says that because of this section alone she is glad to recommend this book and will continue to do so. The outline is such that it may be used with equal ease in the rural and in the urban situations. This of course increases its value in connection with the preparation of state outlines. This is only one of the many valuable and practical features of this new Nature volume.

Nature Readers

and those who follow her in fancy as well as fact, will find many stories in

ST. NICHOLAS

that will please them. During the coming year, such writers and subjects as these will grace its pages:

Wild Things at Play *Archibald Rutledge*
The Woolly West *Charles J. Belden*
Sea Afire
Fishing for Steak and Eggs *Robert Dean Frisbie*
Cold Comfort *Donald and Louise Peattie*
A White Sovereign *Alexander Sprunt, Jr.*
The Chucklehead
The Quest of the Wilson Warbler *Samuel Scoville, Jr.*
Quills *G. Frederick Clarke*
Hollow Trees and What's in 'Em *Paul Belden*

The illustrators include Charles Livingston Bull, Herman Palmer, Mahlon Blaine and Louis Lundean

In addition to such treats as these, there will be found the widest variety of articles, short stories of distinction, and regular departments dealing with Science, Current Events, Stamps, and riddles and, also, a section written and illustrated by the boys and girls themselves—The St. Nicholas League.

If you have a son or daughter, niece or nephew, or young friend, whose pleasure and profit you have at heart, give him St. Nicholas for a year. You will find no investment yielding a higher return in satisfaction, both to the giver and the receiver.

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Historic Jersey Roads

To one who skims over the well-paved highways of the Garden State after having read the publication of the Society of Colonial Wars in the State of New Jersey, *Historic Roadsides in New Jersey*, the towns and country will have a new importance. This little book, concise and attractive, makes every spot alive with adventure, history and national significance by listing the hundreds of places that the patriotic motorist should see; it is a road guide to lead you through a brimming past.

Historical events jammed themselves together with dazzling rapidity in Jersey following the day that da Varanzano, the Florentine, dropped anchor within Sandy Hook in 1524, the book tells us. The Dutch and Swedes struggled for the supremacy; the British, under Berkeley and Carteret, wrested it from both. East and West Jersey were established; quarrels with New York were rife; William Penn mixed his hand into the confused affairs by purchasing East Jersey in 1682. Finally in 1703, the state fused with New York under one Royal governor.

During the Revolution, the book relates, the little colony was the tramping ground for redcoats and colonials, and it shows you where to find evidences of the conflict. Go to Grand and Greene Streets, in the heart of Jersey City, to see where Light Horse Harry Lee once stormed the British Fort of Paulus Hook, then an island. Travel up to Morristown to inspect the old Ford mansion, filled with relics, which was the winter quarters of Washington during 1779-1780. Or visit Boxwood Hall, an important revolutionary war structure at Elizabeth, where Elias Boudinot, President of the Continental Congress, signed the treaty of Peace with Great Britain.

The volume lists all the places in each county having historic interest, and the landmarks worthy of attention. The past development of each community is briefly sketched for hurried inspection. With this book, you can live three centuries over again while travelling through the state.

The work of compiling the material for this publication was begun by the society during the time Charles Lathrop Pack of Lakewood was its governor, and has been carried on by the Historical Committee, of which Francis Chapman is chairman. Rev. Arthur Adams, librarian of Trinity College, Hartford, Conn., has collaborated in obtaining full data on the past of each locality. The mystery is how so much information, together with many excellent half-tone illustrations, has been crowded into the 115 pages.

Walter Lester Glenney, Esq., Secretary, at 916 Madison Avenue, Plainfield, has charge of the sale of copies.

A History of Waste

One of the books that every conservationist should read is Jenks Cameron's *Development of Governmental Forest Control in the United States*, published by the Institute for Government Research at price $3. With impartiality and fairness both to those who believe the government was to blame, and those who see that the real fault lay with the attitude of the people, he traces the situation from the days of the legend of inexhaustibility through the awakening and the growth of order to the present day.

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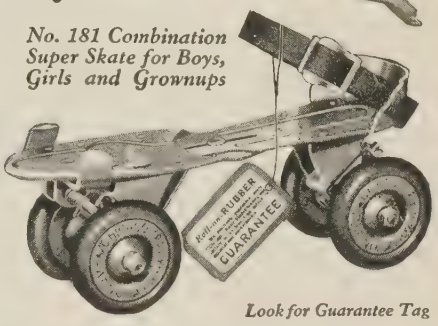

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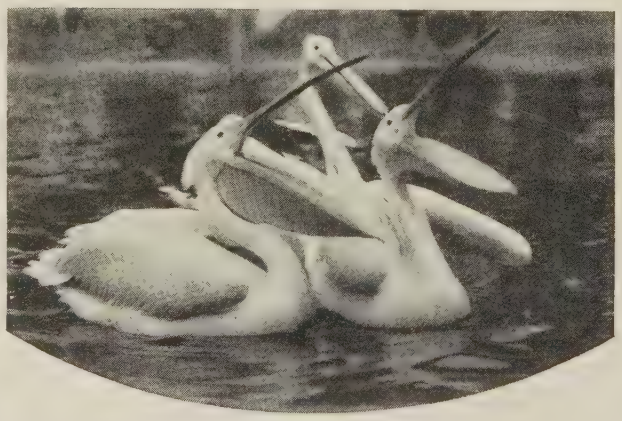
FEEDING *Baby Pelican*

By Herbert Beardsley — It's Quite a Task

An interesting bit of Nature that is seldom witnessed by the general public, is a unique and picturesque pelican dinner party. It is quite a formal affair, don't you know, and goes on a smooth-running schedule that never fails. And it works much the same for the brown pelican as for the white bird who used to flock in great numbers on the surface of Klamath Lake, on the California-Oregon boundary, before that great refuge was drained.

In making the first and essential preparations for the forthcoming dinner party, mother pelican soars far out on the distant lake, diving and swiftly capturing fish after fish. After having swallowed these whole, she returns home. The young bird, awaiting her, renews its imperious clamor for food, and clad in its fluffy white down, stands in front of the parent, waving the stumpy, crooked organs which represent its wings. The croaks never cease until the mother pelican opens her immense beak, points downward, and the young bird eagerly presses forward, and pokes its head into the gaping, leathery pouch. Farther and farther it goes, at last actually stepping upon the rim of the beak. At this point the spectators begin to be nervous at the possibility of tragedy being enacted before their eyes. All sympathy is with the young bird as it apparently pushes on to its doom, a quick death in the deep interior of its mother. However, events proceed too rapidly for intervention. Up and up, and down goes the young bird, until he has pushed his way beyond the beak and down the neck. Then begin contortions which turn the sympathy of the onlooker to the mother, for a terrible contest is apparently taking place between the young bird and its parent, and it seems inevitable that one must emerge from the conflict, mangled and disabled. After a moment of quiet the nestling pelican again appears in the light of day, steps out of his mother's beak, not only unhurt, but replete with a bountiful repast of fish. His croaks are stilled until a few hours have passed, when hunger again arouses him to utterance.



FEEDING TIME

Not an argument. We want our fish, and that right off

As consumers of fish, the pelicans stand preeminent among birds. Their enormous, open pouch is shown in the photograph. They are splendidly winged creatures and can soar for hours on almost motionless wings.

Introducing Nikko Fir

(Continued from page 394)

red spruce or balsam fir, the two varieties most used in the northeast, and Mr. Pack believes that it is more artistic in form than the Norway spruce.

The idea of using this new Asiatic fir, as demonstrated by Mr. Pack, has been taken up by the New York State College of Forestry, and in the spring of 1928 seeds were purchased both in Japan and in this country sufficient to grow 80,000 to 100,000 Nikko firs. These are being tried out in the experimental nurseries on the new Charles Lathrop Pack Demonstration Forest of the College near Lake George, New York, as well as in the experimental station of the College at Syracuse. In the meantime, 1,000 four year old trees have been set out as an experimental Christmas tree plantation on the new Pack Forest on the main New York-Montreal Highway, where thousands may see the little trees as they pass by in their motor cars. As soon as possible a few larger specimens will be set out to test their growth and adaptability to the soil and climate of this region. Scientists believe that on account of its native conditions in Japan, and its adaptability to new ones, it will lend itself admirably to growth in New England and the northeastern states, as well as parts of southern Canada and the Lake States. In its native Asia it grows up to one hundred and twenty feet in height and was introduced into Great Britain as early as 1861, where it can be seen in the famous Kew Gardens.

The part the Christmas tree plays in the joy of the holiday season is incalculable and very large. The introduction of this new tree, foresters believe, will greatly increase the supply without causing reckless cutting in the forests or necessitating vandalism. As it becomes common, as it springs up to dissipate the bare desolation of waste acres and to turn land to a wage earner once more, it will pave the way to the solution of the Christmas tree problem. And the blaze of the Yule-log will cast its gesticulating light on the branches of Christmas trees—, Nikko firs,— in many more happy American homes.

For Christmas Time

From the prolific presses of The Macmillan Company come a group of books of interest to the makers of Christmas lists of books for the young folk. May we describe them all as delightfully-printed and illustrated, and, because of limitations of space and on account of the number of books involved, list them briefly.

Rocky Billy, by Holling Clancy Holling. Being the story of the bounding career of a rocky mountain goat with a sense of humor and gregarious habit. $2.00

Tracks and Trails, by Leonard Rossell. What do the tracks in the snow, the sand and the mud tell the friend and student of Nature? Published by the Boy Scouts and distributed by Macmillan.

Menagerie, by Mary Britton Miller. A collection of juvenile verse about wild life and the outdoors, delightfully illustrated. $1.75

Boga, the Elephant, by K.O.S. A child's story of the African jungle and its various inhabitants. Illustrated by the author, who is Baroness Dombrowski. $2.50

Sokar and the Crocodile, by Alice Woodbury Howard. A lively tale of a small boy who lived in Egypt five thousand years ago. $2.00

The Land of Dreams, by William Blake. A group of poems with the Nature theme and thought. $2.00

Abdallah and the Donkey, by K.O.S. A tale of woe and joy for children from eight to eighty. Illustrated by the author. $2.00

Abdul, by Winthrop B. Palmer. The story of an Egyptian boy and his camel, and a flair for art. $2.00

Juniper Farm, by Rene Bazin. A translation from the French. $1.75

The Wonderful Locomotive, by Cornelia Meigs. For boys who like to see the wheels go around. $2.00

Jane, Be Good, by Isaiah C. Howes. Verses for the youngster, and drawings. $1.75

The Road to Cathay, by Merriam Sherwood and Elmer Mantz. The luring story of the Land of Marco Polo. $3.50

Lost—A Brother, by Emilie B. and Alden A. Knipe. Youngsters' novel against a background of the War of 1812. $1.75

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NATURE IN PRINT

Beneath Tropic Seas

William Beebe has written another book. That is to say, the prosaic world has another opportunity to discover strange and novel creatures in strange and novel places, and to see them from a new mental angle. Mr. Beebe is a cerebral stimulant. He crowds original ideas, conjectures, philosophy in a helter-skelter jumble all over his pages—you must leap from psychic precipice to precipice. He can make dull facts take on life, play hop-skotch, twang a mental banjo. In *Beneath Tropic Seas* he has gone under the waves of Haitian seas to watch microscopic forms play with marine Brobdingnagians and to draw cosmic lessons from their gavottes and ramblings. Readers of Nature Magazine have read two of the chapters, "No Man's Land Five Fathoms Down" and "When Night Comes to Water". The whole is as correspondingly good. G. P. Putnam's Sons publishes the book at $3.50.

Making Birds at Home

Frank C. Pellett knows birds and he loves them. His farms are bird sanctuaries, and the creatures know him for their friend. This is why his new book, *Birds of the Wild,* published by the A. T. De La Mare Company, New York, makes such interesting and worthwhile reading. He tells you how to attract game birds, how to get the songsters and the winter procrastinators; but he tells it by relating his own experiences, by wandering through the memories of years. He is writing about birds; his result is an autobiography which accurately reveals a true Nature lover whose affection for birds dominates a useful and important life.

Over the Campfire

One of the most readable, practical books on outdoor cooking, as well as one which presents the facts of food values in concise, understandable form, is *Kettles and Campfires: The Girl Scout Camp and Trail Book.* Supply lists for definite numbers, methods of carrying and storing foods, what to buy and how to combine wholesome viands in most appetizing and attractive ways are all included in this well arranged and carefully indexed book. To be had for fifty cents from Girl Scouts, Inc., 670 Lexington Avenue, New York.—C.E.H.

The Live Oak

The Live Oak, devoted to Nature on the Pacific Coast, has all the liveliness necessary, and also the sturdiness of the tree. While non-technical, it is most valuable to teachers and Nature-study classes, and is kept small so as to be available to schools in clubs. Its attractive appearance and neat layout recommend it strongly, and those interested in western Nature will find it stimulating and instructive. H. W. Clark edits it at Angwin, California. It is priced at $.50 the year, with special rates for schools, and appears monthly from September to June.

Fifty Years

"Jim" Borland has written his story. You remember Jim, managing editor of the Franklin (Pa.) News-Herald and author of a daily column that is mostly about Nature. Well, when Jim was still in short pants he, with a couple of buddies, started a newspaper, hand-setting their type, gathering their own news, selling their own advertising space and building up their own circulation. At the same time they laid the cornerstone of the newspaper Jim now edits. Since that time a half century has elapsed and Jim has white hair and thousands of friends and he's still in the newspaper game. So he goes to work and writes a book—*Fifty Years in the Newspaper Game* —and in it he tells the story of a life that was useful, full and worthwhile. Jim Borland's book is human, historic and American; and Jim wouldn't swap for millions or world power the privilege he enjoys of looking back over five decades to a life spent with his finger on the pulse of his folks, smiling with them in their happinesses, dropping an honest tear at their sorrows. As some figure it, a newspaperman may not have much when he puts 30 on his last piece of copy, which proves how little some people know. There's no attempt at fine writing in Jim's book;—he's written clean copy without adjectives,—but the heart and the story are in it. Thanks, Jim.

RWW.

Nature and Health

Miss Alice Jean Patterson, of the Department of Nature Study and Elementary Science at the Illinois State Normal University, has completed her series of class books of Nature Study and Health Education with the publication by McKnight and McKnight of Normal, Illinois, of texts for the fourth and the sixth grades. She has formulated in them methods which will arouse a love of Nature while creating an active desire to learn and an initiative which will carry the student beyond the primary school. Nature Study and Health Education notebooks, to be kept by the pupils and to enable them to record their observations, are valuable adjuncts to the texts. With these aids, the busy teacher can find seasonal schedules which will hold the attention and interest of her pupils, produce real Nature lovers and health addicts, and yet really instruct. The books run about a dollar the copy, while the notebooks are about fifty cents each.

Canal Zone Birds

In an attempt to create an interest in the highly colored and beautiful birds of Panama, whose numbers are diminishing under the press of modern economic development and man's customary wantonness, Bertha Bement Sturgis has compiled the first book on these semi-tropic creatures, entitled *Field Book of the Birds of the Panama Canal Zone.* While, as usual, the people causing the destruction will not be the ones to read this work, yet the bird lover will seek it eagerly, for its careful descriptions that note even measurements and habits, and the photographs, sketches and color plates make it the last word on the subject. G. P. Putnam's Sons are the publishers. The price is $3.50.

The Banana

The Banana, its history, cultivation, and place among staple foods, by Philip Keep Reynolds, with illustrations, published by the Houghton Mifflin Company is an extremely interesting study of this most popular fruit. Little does the average person who likes and eats bananas realize how many varieties there are, nor does he realize how old the banana is. Even before the time of Christ, we learn from this study, the Greeks under Alexander were much impressed by this fruit after they had crossed the Indus in their conquest of India. As for its present day place and value among staple foods, the banana is one of the most important, as it is abundant, always obtainable, of moderate cost and high food value, as well as being palatable and easily digested. The book is listed at two dollars.

On Mammal Life

One of our members, C. W. G. Eifrig, instructor in Nature Study at River Forest, Illinois, is the author of a new Nature textbook brought out by Rand McNally and Company under the title *Our Great Outdoors—Mammals.* This is a well illustrated textbook approaching the subject of teaching mammal study in a finely connected and unified way. It links together in its several chapters the various groups of mammals in such a way that the net result should be a well-rounded and comprehensive knowledge of mammalian life. It is not confined to American mammals, which gives it added strength in painting the whole picture. It is a remarkably complete and useful texbook that should meet considerable school favor.

Leaf-Mining Insects

Profusely illustrated, teeming with facts, yet written for the general reader as well as for the student of entomology is *Leaf-Mining Insects,* a complete survey of this important group of destroyers of leaves of our herbs, shrubs and trees. The authors are James G. Needham, Stuart W. Frost and Beatrice H. Tothill. The book, published at $6 by The Williams and Wilkins Company, Baltimore, deals with the general situation concerning this class of destroyers, and also discusses with great thoroughness each of the species.

Among those presents

RIGHT up in the front rank of things to give for Christmas put Eveready Flashlights. Not only because that's one of the easiest and most successful ways out of the Christmas-gift dilemma, but because it's the *sensible* thing to do.

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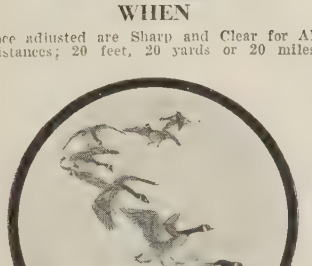

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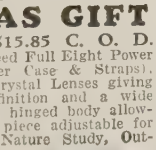

BENNER & COMPANY, D-3 Trenton, N. J.

Natural Soil Tester

A natural soil tester, which will indicate by its flowers the acidity or alkalinity of solutions, is advanced by Frank Thone, of Des Moines, Iowa, as a rival to litmus paper and methyl orange. It is lungwort, *Mertensia,* known also as the American bluebell, and, according to Mr. Thone, its color does not have to be extracted to serve as a tester. As the plant grows, it passes through an interesting series of color changes. The young, immature buds are pink before they open, the mature flowers are blue, but old age brings back pink again. Mr. Thone writes: "These changes may quite conceivably be due to changes in the chemical nature of the sap, from acid in youth, to alkali or neutral at maturity, and back to acid again. If the flowers are put successively into weak solutions of ammonia water and hydrochloric acid, the same color changes will take place".

Feeding Wild Deer

The wild deer of Yosemite, well fed by camp visitors, garbage pails and the Government, are becoming quite epicurean in their tastes, and one has to cater to their dainty desires if he is to be rewarded by proximity, rangers report. They are most enthusiastic about the rind of cantaloupe, while the vitamins in tomatoes have their hearty approval. Plebeian cabbage is relegated to the bottom of the menu, unless nothing else remains. Cookies, Graham crackers and bread are delicacies, but cheese and corn husks only cause reproachful glances. Perhaps in a few generations they will become omnivorous.

A Youthful Helper

Miss Patsy Anderson of Berkeley, California, found a young chipping sparrow after he had fallen, or been pushed or thrown from the crowded nest. She fed him with a toothpick on wheat bread-crumbs, and he prospered, while the parents fluttered nearby. At last one day she sought her reward, asking only that the youngster be fed by its elders from her hand. For an hour she waited, then the mother lit on her finger, but got so excited that she dropped the bug before it got to the open beak. The male was more successful, and the mother soon learned from him. "But the poor little adventurer met a tragic end. It insisted upon jumping from the nest and trying to fly. It was eaten by my cat".

Forest Fires

While the damage caused by forest fires on protected land proved to be only one-fourth as great in 1927 as in 1926, losses on unprotected lands mounted from eleven million dollars to twenty-nine millions, the Forest Service recently revealed. The proportion burned was reduced from 1.21 percent in 1926 to .61 percent in 1927. Smokers caused the greatest damage. The Middle Atlantic and Southeastern States showed the greatest gains in fire prevention.

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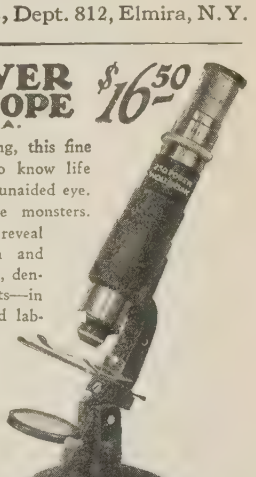

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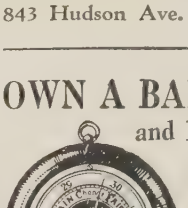

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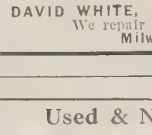

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The Missing Words

1	Bob White	14	Cardinal
2	Jenny Wren	15	Kites
3	Phoebe	16	Flicker
4	Martin	17	Bunting
5	Lark	18	Crane
6	Quail	19	Killdeer
7	Goose	20	Butcher Bird
8	Thrasher	21	Ovenbird
9	Canary	22	Rail
10	Swift	23	Swallow
11	Tern	24	Sandpiper
12	Blue Jay	25	Cuckoo
13	Crow	26	Eagles
		27	Auk

Forbush Refuge

Even if the ornithological works of Edward Howe Forbush, for many years a leading bird authority in the United States, did not exist to assure him immortality, the recent action of the Federation of Bird Clubs of New England in purchasing a five hundred acre tract in the Berkshires to be known as the Edward Howe Forbush Wild Life Reservation would assure the perpetuation of his name and his fame. The refuge, which has been offered to the Commonwealth of Massachusetts, is situated in the most picturesque section of the Berkshires, and wild life abounds there. It should be a fitting memorial to a man who served his state and his science so well and for so long.

Notch Notes

Interesting to those who have gazed up at the Old Man of the Mountains, in the White Hills of New Hampshire, are the "Notch Notes" of C. T. Bodwell, Nature enthusiast and best friend of the rock-bound gentleman, which appear weekly in the Littleton, N. H., *Courier*. Mr. Bodwell recently was the host to Mr. Jex of our Art Department when the latter was working in the mountains. Concerning what he did there Nature Magazine readers will learn more anon.

Prolific Birds

An enterprising pair of mockingbirds who nest near the home of Miss Bess M. Goodell of St. Petersburg, Florida, and are quite intimate with her, achieved a remarkable feat last spring by raising four families of youngsters, the last two at the same time. The male did all the work about the third nest, feeding, incubating, and instructing, while the mother, busy with her fourth brood, forgot her older children. Miss Goodell reports healthy babies, but as she aided their diet with raisins, it is no wonder.

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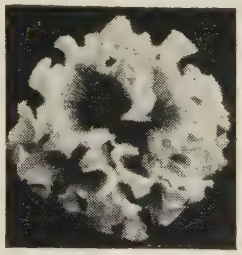

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NEWSPAPER NOMINATES THE MORNING-GLORY

The Cincinnati *Enquirer*, as the first newspaper in the country to place a flower in nomination for the National Flower campaign, advocates the morning-glory in the following editorial which recently appeared in its columns. The interest of this paper is indicative of the view the press has taken on the national poll. Under the heading, *The Morning-Glory Trumpets*, the *Enquirer* says:

"Just now the morning-glory trumpets are pealing their reveilles to the dawn of autumn days. Their color tones are in harmony with the hues incorporate in the national banner. They salute us in whispers of red, white and blue. Their corollas are shaped like the stars in the flag's clear field of azure. They tell us of victory and pride, of the Nation's triumphs, of its hopes and dreams; they turn to the splendor of the sun and bend to the caresses of the winds of peace.

"An effort to find a public choice for a national flower has been launched by the American Nature Association. Lovers of the columbine, goldenrod and wild aster will urge the claims of their favorites; there will be those who would nominate the phlox or the daisy or the violet; others who would prefer as the Nation's floral symbol the nasturtium, the sunflower, the carnation, the rose, the zinnia, and so on through the perfumed colorful chapter.

"But why waste time in making this selection? Why not unanimously agree that the morning-glory is fittest to symbolize the majesty, power, potency and progress of the greatest nation under the kindly sun?

"This modern flower kisses the breath of our colder climes and laughs with the warmth of the Southland's welcome. It clusters in vines which cling with the ardent closeness of a true lover's embrace. It is of the freshness of the morning and is comrade of the dew. It wills its reproduction without fear or secrecy. It sings in the language of the rainbow. It is a trumpet blown by heaven's heralds. It is sweet with the soft passion of simplicity. It knows no dividing horizons. It holds within its heart greetings to the sunburst, farewell to the close of joyous days and promise for the unfolding future.

"Let the American Nature Association take notice!"

"Our Hobbies"

As an outgrowth of the Nature work at the Children's Museum of Boston the boys and girls have gotten out a magazine entitled *Our Hobbies*. It is planned and edited by the youngsters between the ages of ten and sixteen, and in less than a year it has progressed from a mimeographed issue to a printed one. It is full of reports of Nature experiences, past, present and future, and serves to crystallize them in tangible form. E. H. Bamberry is editor. It is a fine development for which all hands deserve much credit.

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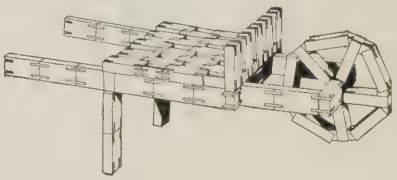
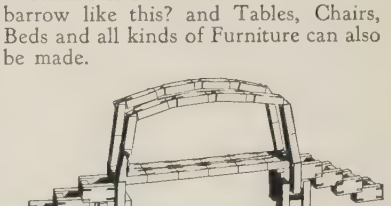


Wouldn't it be fun to make a wheelbarrow like this? and Tables, Chairs, Beds and all kinds of Furniture can also be made.



And here's a foot Bridge built with KIDDIE BLOX which shows how you can build the frame work for towering skyscrapers.

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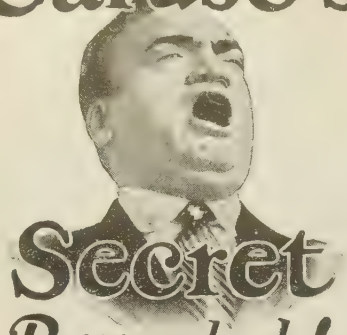
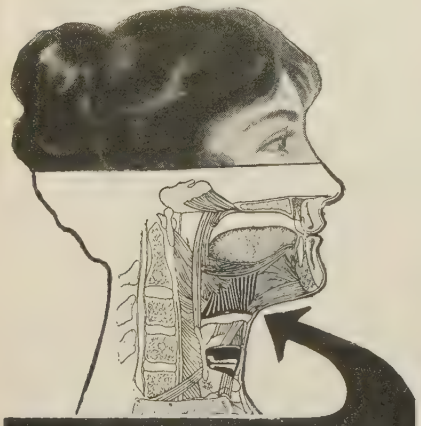
Caruso's Secret Revealed!



A post-mortem of Caruso's throat showed a superb development of his Hyo-Glossus muscle—the basic reason for his tremendous vocal power.



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.....*Age*.....

Nature Bulletin

When we were very young, and in school, one of the many faults we found with our biology course was that little provision was made, except by a few isolated field trips, for bringing book, theory and practice together. When we learned about "pupal stages", we said, "that's fine", and then went swimming, because we didn't know where, how and when to look for pupal stages. The Troy, N. Y. High School, however, has taken a big step to fill the gap by arranging, each month, a timely Nature bulletin board, on which suggestions for work and incentives to investigation are placed. Livingston S. Jones, who is in charge of the board, explains that it contains news items on happenings in the "Nature World", a Nature calendar, a Nature question box, a "What to Look For" section, a "What to Do" strip and other Nature hints and helps. Every two weeks or so, another bulletin, a "special topic" one, is arranged, to duly give notice to special weeks or events, such as "Forestry Week". Pupils collect the material; Mr. Jones arranges it. The plan has been very successful, we are informed. Here is a most satisfactory link to connect the desk with the world, and give reality to science.

Spare That Hawk

When a hawk is killed one of the best friends of both hunter and farmer has been destroyed, according to W. B. Grange, superintendent of game of the Wisconsin state conservation commission, who makes a strenuous plea for these persecuted birds. He points out, as the American Nature Association has frequently done in its bulletins and articles, that the vermin consumed compensates many times for the little harm done; examination of the crops of birds have revealed, he asserts, that only the Cooper and sharp-shinned varieties prey on game to any appreciable extent. Mr. Grange warns that all beneficial species are protected under the national Migratory Bird Act. The American Nature Association is indeed proud to have such a progressive state lined up with it in the defense of these birds.

$5,000 Reward

The de Clair Laboratories of Los Angeles have offered $5,000 for information leading to the discovery of a dolomitic limestone deposit which is known to occur somewhere in California, Arizona, New Mexico or Nevada as an outcrop of a pre-Cambrian formation. This material is sought because of its sensitiveness to static electricity and imperviousness to dynamic electricity. Radium and X-rays have no effect on it, and its properties have made it worth about $84 a pound.

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Hawks and Owls

In September *Nature Magazine,* K. Harrington described the finding of the dead bodies of a marsh hawk and an owl, who apparently had fought to the death. An eyewitness to such a battle has been discovered in the person of Frank Letl, who recorded the event in his Nature diary. He flushed a marsh hawk and a short-eared owl in the woods: "Later, the hawk and owl got into a fight. The owl managed to stay above the hawk, and swoop down, while the hawk would dash up and turn on its back, talons in the air. At last the hawk got above the owl, and that bird went to earth. Again and again the hawk attacked with no success." Finally Mr. Letl shot the owl, as he was on a collecting trip.

The Vanishing Grizzly

The grizzly, enemy of man, robber of his cattle and chief predatory of the range and mountains, is about to vanish from our mountains, if the statement of the American Game Protective Association that they are nearer extinction than the buffalo ever was can be accepted. The Federal Government estimates that less than a thousand remain in the United States, most of these being located in Montana. They reproduce slowly, and eager hunters have driven them from their happy hunting grounds of yore. They have long been outlaws in most sections. Yet in Yellowstone National Park they have learned to be quite friendly and civilized. Shall this remnant of one of the "varmints" of pioneer days be allowed to die out? Or are his history and deeds picturesque and romantic enough to gain for him a place of safety in American game refuges?

For Mosquitoes

When the battle is over, prepare for the next battle. Though the mosquito season has gone, the enemies of the malaria carrying breed will welcome another weapon for another year in the form of paris green, which, if blown over breeding ponds, will kill larvæ feeding on the surface. Airplane dusting is effective, and tests at Quantico, Virginia, last year indicated that the cost would be but 72 cents an acre. *Mosquito Remedies and Preventives,* prepared as Farmers' Bulletin 1570-F by Dr. L. O. Howard and F. C. Bishopp of the Bureau of Entomology contains this and other valuable information on ways of defeating these pests.

Gladioli Misbehave

Perhaps some others of our gardener-readers have had an experience similar to that of Dr. David T. Marshall of Hollis, N. Y. Dr. Marshall writes that he has been a "glad" enthusiast for some years, favoring crimson and salmon blooms. This year, out of fifty plants that blossomed, every one has been yellow with a pink tinge. A neighbor had the same experience. He suggests that either yellow bulbs were the only ones to survive the winter; cross-pollination took place or the bulbs reverted to an originally yellow type. He wonders if others have encountered such a condition.

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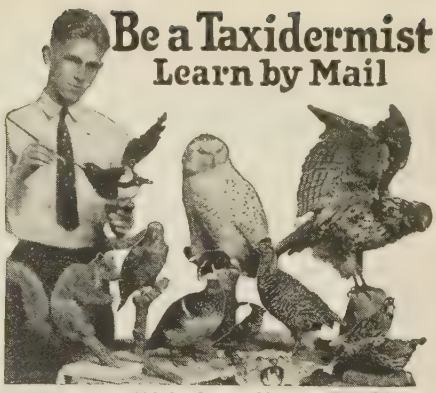

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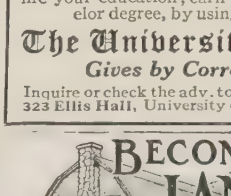

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The Starling

If any bird is unpopular, it is the English starling, who runs the English sparrow close second for the honor of being the most heartily disliked. Yet according to S. S. Pennock of the Pennock Company, florists, in Philadelphia, the starling is the most successful hunter of the green-bronze pest, the Japanese beetle. When the young creatures are still in the larval stage, the long bill of the starling roots them from under the ground, and in one day kills more than a farmer in a week. Miss M. Elizabeth Lester, of Pennsylvania, who called our attention to Mr. Pennock's remarks, writes: "It is up to each one of us to help the birds get rid of the pests". Perhaps such unpopularity has been undeserved.

How Fast Does an Animal Run?

Assertions are frequently made about the running ability of animals, some people stating that a jack rabbit can lope over the prairie at sixty miles an hour. The day for such reckless declarations has passed. Modern science demands accuracy and wants the proof of statements and needs to know just how the measurements were made. More observations are needed and should be accurately recorded, with explanations, detailing how the speed determinations were made. Opportunities for these observations and tests of the speed of animals come rarely to any man, but they should be recorded, provided the measurements are accurate.

An animal can doubtless alter its speed according to circumstances.

The fastest speed made by running man, in the hundred yards' dash, was 20.7 miles per hour; but the Olympic marathon record speed average was only 10.2. The record trotting speed of the horse has been a little over 38 miles per hour. A horse can easily overtake a cow, bull or buffalo.

Mr. William L. Finley recently reported measuring the speed of a pronghorn antelope by chasing it with an automobile. The pronghorn ran at a speed of 45 miles per hour when pursued.

Dr. Harold B. Wood, who for years has been measuring with an automobile the speed of flights of birds, reports chasing jack rabbits along the roads of the western plains at speeds from 20 to 25 miles per hour. He has accurately timed a cotton-tail rabbit at 11 miles, numerous dogs at 20, pigs at 11 and chickens from 6 to 9 miles per hour.

More observations should be recorded, but only accurate ones.

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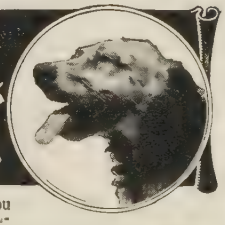

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The American Tree Association stands for a constructive policy of forest protection and extension, to increase appreciation of forests as natural resources essential to the sound economic future of the country.

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TWO MORE editions of the Forestry Primer, one hundred thousand each, have been given to the school teachers of the country by the American Tree Association thus far during the school year. This makes the total distribution two million three hundred thousand copies since the first hundred thousand were printed to mark the semi-centennial of the first step in forestry by the United States government. The school teachers of the land are enthusiastic in their praise of the Forestry Primer which they are using in project work in various ways. Some use the booklet in English classes, others in geography and science classes. The men and women of the next voting generation, it is safe to assume, will be "forestry minded". Coupled with this distribution has gone a fine co-operation on the part of the editors of the country who are constantly keeping before their readers in a news and feature way the great economic need of putting our millions of acres of idle land to work growing trees. "As we look to the new year now at hand," says Charles Lathrop Pack, president of the American Tree Association, "there can be no doubt as to the future of forestry. Much is still to be done in the way of education and of course we keep everlastingly at it. I cannot give too much praise to the school teachers and the editors of the land. Our population is increasing at the rate of about a million a year. Only through the teachers and the editors can we reach the public that is vitally interested, in the last analysis, in having a steady flow of forest products always within reach. We must grow trees for a growing people."

An example of the good work being done in many places is that of the sixty students of the Boys' Technical High School of Milwaukee who are making a pine forest out of a barren potato field in the county's Brown Deer tract. The tree planters have all been made members of the American Tree Association.

Under the direction of O. C. Strothman of the faculty, the boys have planted close to 6,000 pine seedlings on four acres. The seedlings were planted six feet apart. The crew was divided up into teams of two each. Some of the boys drove stakes and laid out the rows. Then, working in a stagger formation across the field, came the planting teams. One boy dug the hole with a grub hoe and the other took the seedling from a pail of water and set it in the hole. Earth was stamped tightly around the seedling.

"As a result of this day's work we now have a partially trained crew of young foresters," Mr. Strothman says. "Now that these boys have actually planted trees it is not likely that they will ever destroy a tree needlessly in the future. They take pride in what they have done. To commemorate their work we will mark each row of trees with a metal slab inscribed with the names of the students who planted the rows. With this trained crew we hope to aid in the planting of trees at other places in the country."

So keen has been the interest in tree planting, the states that have state nurseries are setting up some new records in putting idle land to work for the future. New York and Pennsylvania are the leaders in this. New Jersey is doing good work in planting, as is Indiana. To show how the interest is increasing, Indiana distributed 600,000 seedlings this year while only 13,000 were distributed in 1922. It is expected the distribution will reach a million in 1930. New Jersey planted more than 1,000,000 seedling trees last spring. The increase over the previous season is about 75,000. Most of them have been put on watersheds and on lands unsuitable for farming. Thus is the state trying slowly to repair the ravages of past years of wanton tree destruction. Nebraska has long been planting wholesale. New York began the work of reforestation in 1901. Last year approximately 25,000,000 trees were put out, of which more than 5,000,000 were planted by the state authorities.

It is a good thing this work is going on because forest fires are always damaging. On unprotected lands there has been a big increase in the number of fires. In 1927 reports being compiled show 123,000 fires on unprotected areas and that 35,747,000 acres were burned over. The damage is estimated at $29,088,000 by the United States Forest Service. It must be remembered, however, that it takes a long time to replace these trees. The previous year the area burned was 19,561,000 acres. On protected areas the loss was cut down in 1927. The protected area burned was 2,784,000 acres. Here is another argument, not only for increasing fire prevention, but for the public becoming "forestry minded", so that appropriations may be made for this work.

At the convention of the State Federation of Women's Clubs, at Biloxi, Miss., Mrs. G. H. Reeves, Chairman of Conservation, announced the prize winners in the Clubwomen's section of the State Forest Service poster contest as follows:—First prize, ($25.) to Mrs. C. I. Graber, of the Yazoo City Woman's Club. Second prize, ($15.) to Mrs. Robert Lee Beck of the Hattiesburg Century Club.

Dedicated to Mrs. Willard Bayliss, president of the Minnesota Federation of Women's Clubs, and the memory of Mrs. Leona Rounds, former president, two evergreens are to be planted at Mankato when the federated clubs meet in that city. Mrs. John E. Palmer, of St. Paul, state conservation chairman, dedicated the tree honoring Mrs. Bayliss, and Mrs. P. G. Schwang, of Dodge Center, the tree to Mrs. Rounds. Mrs. Bayliss is furthering the federation's campaign for planting living Christmas trees.

Eight living Philadelphians and a contemporary who died recently were honored at Willow Grove Park when nine trees were planted in a Grove of Honor to perpetuate the memories and accomplishment of the city's leaders in civic and industrial progress. Impressive ceremonies and special music marked the planting of the trees. The planting will be made an annual event. Those honored are—the late Jules E. Mastbaum, Mrs. Lucretia Blankenburg, Philip H. Gadsden, Cyrus H. K. Curtis, E. A. Fleisher, Judge J. Willis Martin, E. T. Stotesbury, Thomas E. Mitten, and Samuel M. Vauclain.

So it is seen while tree planting on large scales is going on there is a great deal being done in other ways. Memorial trees, Roads of Remembrance, Memorial Avenues, are being planted by Scouts, Camp Fire Girls, Women's Clubs. These plantings, of such great help in an educational way, are being registered on the American Tree Association honor roll. In your plans for the spring send to the Association for its tree planting suggestions and a Forestry Primer.

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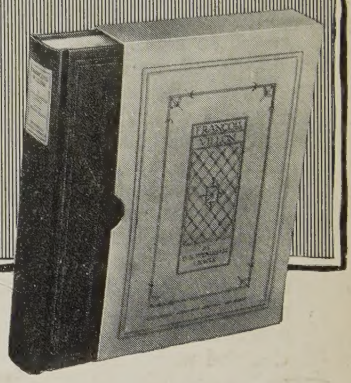

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